FLIGHT

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A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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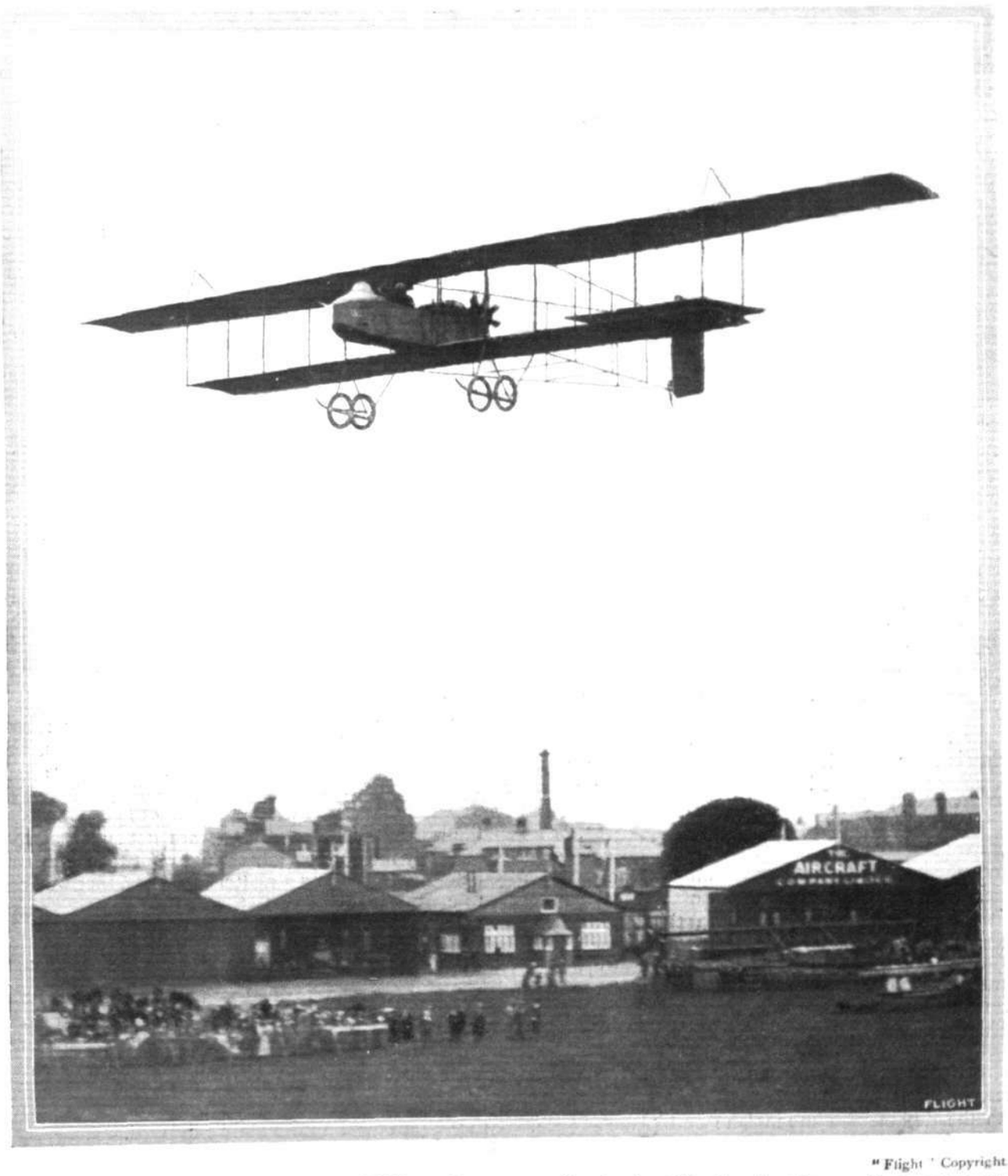

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Mr. Grahame-White's "Wake Up, England!" Henry Farman machine back at Hendon Aerodrome. In our photograph Mr. Noel, with Mrs. Stocks as passenger, is flying in the speed handicap last week-end.

EDITORIAL COMMENT.

The Ban on Monoplanes.

It would be a pity if the decision of the authorities temporarily to prohibit the use of monoplanes on army service were wrongly interpreted by the man in the street, yet we fear that it is more than likely to be so. Let us first then draw attention to that great principle underlying military service, which was summed up so completely in Major Burke's remark to a press reporter: "We fly when it is our duty to fly." The service of the King and the Country permits no personal interest to stand against the performance of duty. An officer of the Royal Flying Corps is told to fly, and he flies, which is all there is to say about it. He would fly a broomstick if it were possible and necessary, and he will fly to certain death with the same willing obedience that he brings to bear upon the performance of any other of his varied duties. Such being the case, a grave responsibility rests on the shoulders of those who give the orders, and it is no more than is demanded by humanitarian principles that "they who must be obeyed" should give pause when they are faced with conditions that they do not quite understand, but which seem, on the face of it, to be jeopardising the lives of those who stand to them in this matter somewhat as it were in the position of "children."

The fact that several officers have unfortunately been killed on monoplanes, has undoubtedly given rise to the impression that monoplanes as a class are more dangerous than biplanes as a class. In the light of our limited knowledge of the subject, it is not for any authority to adopt an *ex cathedra* attitude on the mere support of personal opinion, and since to continue the use of monoplanes in the face of the opposite point of view, would be tantamount to the assumption of such an attitude of mind, the authorities have very properly decided that, being in doubt themselves, they will temporarily stop their use, pending further enquiries. The prohibition at any rate does not kill anybody, but it may give monoplanes a bad name—indeed, it has already, in combination with the accidents which have led the authorities to their decision, done that much—and to that extent the need for enquiry is urgent because the aeronautical industry cannot afford, in its present undeveloped state, to wait while the bad impression dies a natural death or expires by simple effluxion of time. Thus the sooner we get a consensus of opinion, the better, and it is to be hoped that the evidence brought to light by the Public Safety and Accidents Investigation Committee of the Royal Aero Club will materially assist the process.

So far as the very meagre information at present available is concerned, it is really impossible to say how far recent accidents have been due to some failure of a mechanical detail such as might have happened on any sort of machine, or how far either the mishap itself, or its fatal consequences, have been influenced by the characteristics of monoplane flight. These things, as we say, it is impossible to argue in the absence of well considered and authentic data. The one essential thing now is that a completely open mind should be kept until such time as that data becomes available and enables us to pass an unbiassed and considered judgment in the matter.

On the subject of monoplanes *versus* biplanes in general, there is really only this to be said, namely that both are a natural evolution of a basic idea into a concrete form, the basic idea being to achieve certain characteristics in flight and having nothing whatever to do with the design of a monoplane or biplane as such. In other words, the monoplane is the natural consequence of trying to produce a high speed machine, because its single pair of wings and readily streamlined body offer the simplest mechanical solution to this problem.

Alternatively, the designer who starts out with the idea that his machine shall possess the quality of wide speed range, is faced with the immediate necessity of providing a wing area of such magnitude as immediately suggests to him the subdivision of the surface into two units—hence the biplane.

If, however, we look at the two types merely as machines, or rather as engineering structures, we are, of course, impressed with the simple strength of the natural box girder afforded by the biplane system, in which the four wing spars form four natural booms that can be readily trussed together by vertical struts and diagonal wires arranged at intervals so as to form panels along the whole length. In a monoplane, however, the engineering problem is really equally straightforward, each wing being a cantilever and, therefore necessitating top and bottom trussing to some form of mast-like abutment.

In starting out to compare the monoplane and the biplane, we assumed that the origin of the design of the former type was a desire to build a machine that would attain a great speed in the air. High velocity involves, as a *prima facie* argument, great power; and the driving of any sort of machinery that is either fast or powerful above the average, ordinarily calls for skill above the average, too. Thus, we could hardly expect at any time that the more advanced types of machine (when, by advanced, we mean progressed, in the above sense) would be readily serviceable in the hands of the inexpert, nor, in fact, should we ever regard it as less than a matter demanding considerable practice when even an expert pilot takes command of a machine that is more powerful or faster than those to which he has been used. Any one of a number of different minor factors may exert a disconcerting influence on his control, to all of which he needs to be thoroughly accustomed before he can possibly feel that he is reasonably safe. That these things need to be understood is clear, and equally is it clear that the only man who can give us the information essential to their understanding is the pilot who takes the risk of first using the machine.

We have been ambitious these last twelve months and therein lies, in all probability, the real gist of the present situation. Think for a moment how little while ago it was when no one could fly at all, and how recently it was when no one would fly save in the calmest weather. And now what is the situation? Here we have in England to-day a body of men, the Royal Flying Corps to wit, every one of whom is willing to go up in the air at the word of command. We are not surprised that any seriously minded person should want to mark time a bit before accepting, as a matter of course, that we are fitted to continue going that fast.

As the matter stands now, we can only await with patience the official report and that of the Public Safety and Accidents Committee on the causes of the disasters, and when these are issued we trust that it will be found that the monoplane as a type will be acquitted of blame. Any detail structural weakness is only a question of a relatively small amount of experiment to rectify, and by reason that in the meantime it is an undoubted fact that the monoplane rests under a serious cloud, we trust that the Reports will not be unduly delayed.

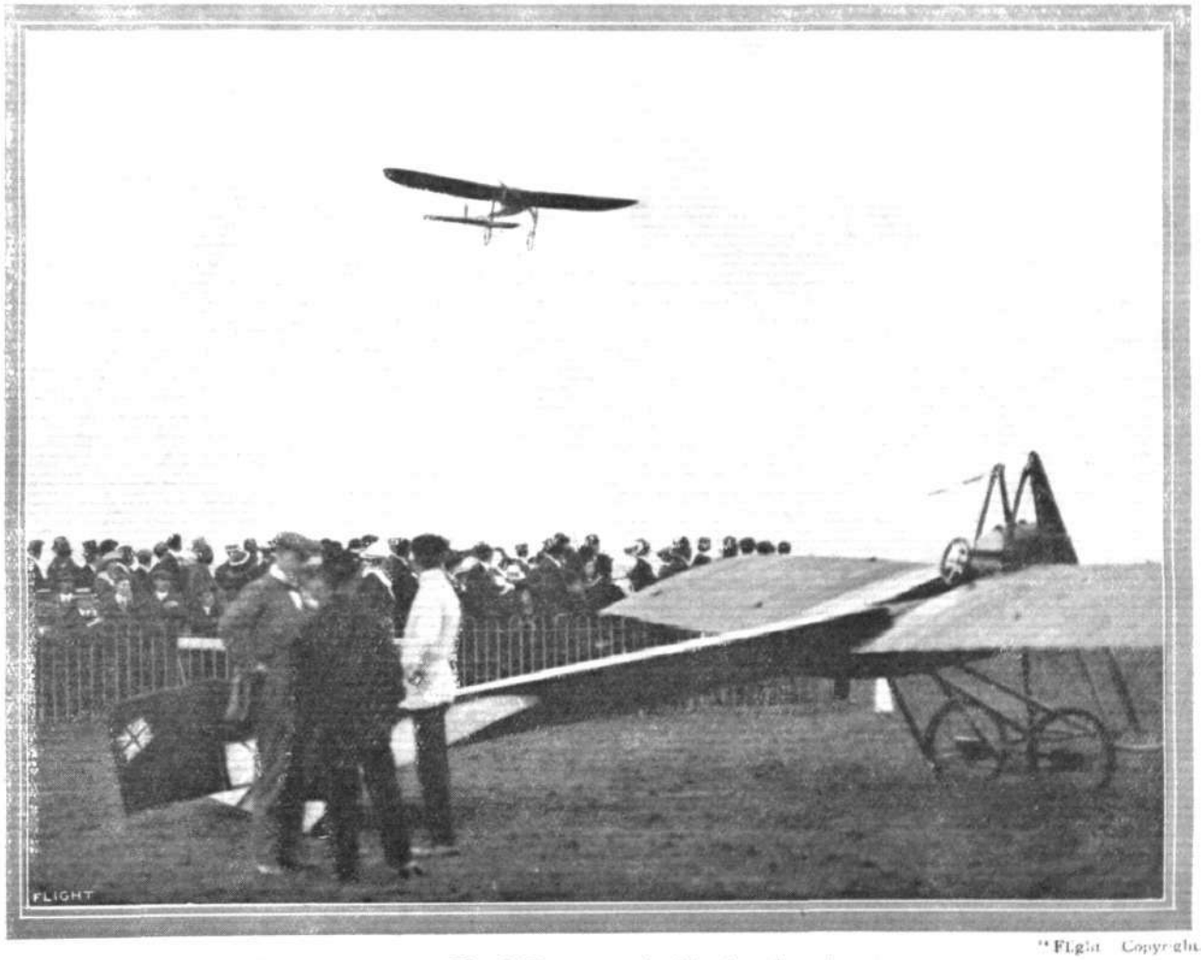
HENDON AUTUMN MEETING.

THREE events were decided at the Autumn meeting at Hendon last Saturday before a very substantial "gate," about 15,000 strong, and in very pleasant, though fresh, weather. Quite a number of trial flights were made before the meeting opened officially, Marcel Desoutter, on the 50-h.p. Gnome-Blériot, making several trips, whilst Lewis Turner made a splendid flight on the 70-h.p. Gnome-Henry Farman ("Wake Up, England!" 'bus), with a mechanic as passenger. With this fine machine Turner had a chance of showing what a really good pilot he is, although the way he handles the old school machines is sufficient to convince in this respect.

At 3.25 p.m. Louis Noel took a passenger up in the "Wake Up" Farman, and Sydney Pickles—who is now a member of the Ewen school—was up in the 35-h.p. Anzani-Caudron biplane. Both were up for about 8 mins., Pickles finishing with a fine semi-spiral *vol plané*. J. C. Travers then made a three-minute flight on the Grahame-White biplane, after which Mrs. Stocks went up on the Anzani-Blériot for about 7 mins. J. L. Hall was also out on his 50-h.p. Gnome-Blériot.

A start was then made for the Grand Speed Handicap, Mrs. Stocks on the Anzani-Blériot with 45 secs. start and Travers on the Grahame-White biplane (scratch) making up the first heat. Mrs. Stocks had to start with the wind, and owing to the small power at her disposal had the greatest difficulty in keeping the monoplane straight, coming quite near a capsize several times. She stuck to her task very pluckily, however, until at the railway embankment and then gave up. The result was that a fresh handicap was arranged, it being decided to have a single heat of 6 laps of the aerodrome between Desoutter on the Blériot (scratch), Noel, with Mrs. Stocks, on the 70-h.p. Henry Farman (1 min. start), and Travers on the Grahame-White biplane (3 mins. 15 secs. start). Both Travers and Noel got well away, but Desoutter only got about four or five hundred yards when he had to stop, owing to trouble with his elevator. At the end of his second lap, Travers had to descend owing to engine and propeller trouble, so Noel and Mrs. Stocks finished alone, covering the 6 laps in 14 mins. 32 secs. Just before the second event, the bomb-dropping competition, which was the feature of the afternoon, Desoutter made a short flight on the Blériot, now going well again. The bomb-dropping competition was quite exciting, if not instructive, as it showed that to drop a missile from between 100 to 200 feet up, into a marked space of about 100 feet diameter was not quite so easy as it looked. Three shots each were allowed, and the bombs were plaster balls, about the size of a croquet ball, containing flour. The first to have his three shots was Turner—who carried his bombs in the FLIGHT photographer's camera bag!—on the Henry Farman. His first shot fell just outside the circle 73 feet from the centre, and his remaining shots were also outside the mark at 135 and 104 feet from the centre respectively. Desoutter made the next attempt, but had great difficulty in getting a clear view of the target, so his shots fell rather wide; they were as follows: 243 feet, 213 feet, and 256 feet. After Desoutter's attempt, Travers had a try on the Henry Farman. His shots were exceptionally good the first being 47 ft., whilst the second attempt, which he made soon after the first, turning the biplane very sharply, was well within the mark, 26 ft. from the centre; the third shot fell at 92 ft. Noel then took over the Henry Farman and also put up a very good show, his shots falling at 80 ft., 61 ft., and 48 ft. The last man was Sydney Pickles on the Caudron, who, considering the fact that he had to turn completely round in his seat and drop the bombs out behind, made some very good hits, viz., 114 ft., 108 ft. and 39 ft. The winner of this event was, therefore, J. C. Travers, with an average of 55 ft.; Noel, 2nd (63 ft.); and Pickles, 3rd (87 ft.).

Whilst the bomb-dropping competition was in progress Lieut. Reynolds, R.F.C., was out testing the Army Maurice Farman No. 207. Just before six o'clock two attempts were made for the altitude contest, by Desoutter on the Blériot, and Sydney Pickles on the Caudron biplane. Desoutter was soon lost in the clouds, appearing and reappearing with startling suddenness. He came down after having reached an altitude of 2,000 ft., whilst Pickles, who was lost to view for quite an appreciable time, kept climbing until he had reached 2,850 ft.—a remarkable performance for this little biplane. While Desoutter and Pickles were up for altitude, Turner was making several passenger flights on the Henry Farman, and Hall was also flying the Blériot.



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Marcel Desoutter piloting No. 6 Bleriot in the Hendon Aerodrome competitions.

THE FACTOR OF SAFETY IN AEROPLANE DESIGN.

IN an interesting article elsewhere, Mr. Granville E. Bradshaw opens a discussion on a subject of great importance in aeroplane design, and although we do not altogether agree with everything that he says there, nevertheless the matter is one that easily affords scope for a wide range of opinion.

In order that the uninitiated may grasp just what the whole subject is all about, we would explain that "factor of safety" means the number of times by which the strength of some component part of a machine exceeds the maximum anticipated stress that it has to endure. Since, therefore, we are dealing with a *multiplication* factor, its injudicious choice may make a great portion of the machine several *times* heavier than it need be—or several times lighter than it should be. It is clear, then, that the choice of a suitable factor of safety is vital to constructor and to pilot alike.

Considerations for detail improvement such as may arise from the niceties of theory sink into utter insignificance by comparison with the ruthlessly obliterating influence of a factor of safety that is too high, because it may so easily prevent all chance of realising the fruits of some carefully thought out refinement. Design, in fact, is throttled at its very inception by the present unsatisfactory position of the factor of safety, and although we do not much favour an arbitrary ruling on matters of individual opinion and experience, nevertheless we really believe that some useful result might come of a discussion on the subject, if the Aeronautical Society saw fit to undertake its organisation and to ensure that the constructors with the requisite experience were brought together for the purpose.

If, as the result of some such conference, it were possible to establish, for the time being, an "accepted figure" (let us say 8, for the sake of example) as the factor of safety appropriate to the principal components of an aeroplane, then a constructor who was in the habit of exceeding this value would feel that he might design, at any rate an experimental machine, a little finer without exposing himself to moral censure. Conversely, another constructor who might be building appreciably below the specified factor would, as it were, be faced with a standing caution that, in the eye of respected opinion, his machines encroached too much upon the experimental field. Not an arbitrary condemnation in any way, you understand, but merely a consideration that he, equally with others, would wish to bear in mind.

The utility of such a conference is governed mainly by the present need for such a decision; mere academic talk on the subject is of no consequence one way or the other, because its results are not going to produce *the* numerical value of the factor of safety that is appropriate to the design of aeroplanes, but merely to establish *a* numerical basis for a kind of mutual moral support among those who are actually concerned with the building of such machines or who are otherwise qualified to criticise them.

As a matter of fact, we have some reason to believe that a recognised factor of safety would be welcomed by more than one builder of aeroplanes, and that not so much because he in any way lacks confidence in his own design or workmanship, as because, at the moment, the governing factor in the choice of a factor of safety is apt to be unduly influenced by extraneous considerations. Thus, pilots have been known to refuse to fly this or that machine until this or that wire or strut is strengthened. Now the opinion of the pilot may be right, or it may be wrong. In any case, it is not to be ignored. But, how shall a constructor gauge its value, unless he has some sort of recognised standard to go by?

If he measures the pilot's advice by his own opinion, then it is merely one opinion against another, and, since the machine is built to be flown, and the pilot is the man who risks his neck in flying it, it is the constructor who is most likely to have to give in. As Mr. Bradshaw points out, however, the physical strength of parts is by no means the pilot's only security in mid-air, and, as he further suggests, an unduly strong machine may also be unduly unsafe, for the very reason that its excessive strength has upset the conditions proper to the design, by adding an unnecessary amount of useless weight and, doubtless, useless head resistance also.

At the Military Aeroplane Trials, it was clear to see that there was a considerable lack of uniformity as to the factor of safety in the different designs. In some cases this was, probably, the real handicap under which some of the newer British designs suffered so heavily; their constructors having desired, before all else, to build worthily of British traditions in respect to strength of parts.

With regard to Mr. Bradshaw's further conclusions as to wing area and loading, these are more in the nature of a personal opinion that it is well within the province of manufacturers to discuss, but which necessitates, in the first instance, the acceptance of a definite point of view as the proper origin for the design of machines. In effect, Mr. Bradshaw recommends, when he specifies such values as 17½ lbs. per h.p. with 3½ lbs. per sq. ft., what on the basis of our recent analysis, would be termed a machine with a low anticipated efficiency. The equivalent value of X is only 61 so that the appropriate flight speed is in the order of 30 m.p.h. and the anticipated efficiency $\epsilon = 48$ per cent. In other words the machine, when well built with a low head resistance and a good gliding angle, is to possess a very wide range of speed and a capacity for flying very slowly. It is necessary first to recognise that these qualities are virtues worthy to serve as the main object of the design, however, before it is even worth while discussing the difficulty of attaining them. Apart from difficulty altogether, designing for a lower value of ϵ than can readily be attained in practice has the basic drawback of being a handicap if the machine is afterwards to be judged on an efficiency basis, wherein maximum speed is an essential factor, and it is not reasonable to suppose that a manufacturer will strive after an effect that fails to be appreciated, if, by doing so, he makes his machine appear mediocre in the judge's eyes.

Arbitrarily to design for low value of ϵ is the direct way of increasing the speed range and low speed manœuvrability, and provided that there is a premium on these qualities, it is likely to be tried—but it will not be so easy to succeed, as Mr. Bradshaw himself points out.

In his own selection of values, Mr. Bradshaw already sets a problem of no mean difficulty, as may, perhaps, be more readily explained with the aid of our constant X and its satellite ϵ. Thus, in selecting 17½ lbs. per h.p. with a loading of 3½ lbs. per sq. ft., Mr. Bradshaw designs for $X = 61$, an appropriate flight speed in the order of 30 m.p.h., and an anticipated efficiency ϵ of less than 48 per cent. It is clear on the face of it that the machine is intended to have a very wide speed range and great facility for slow speed manœuvrability. Let us, however, enquire more closely into the probability of obtaining in the way suggested this unusual development of special qualities. For example, we will assume that the machine is well-built and that in respect to low head resistance and good gliding angle it is an example of what might be called the 80 per cent. type. Turning, therefore, to the 80 per cent. chart published last week we find that the suggested 3½ lbs. per sq. ft. might be accompanied by about 39 lbs. per h.p., or more than twice as much as the estimate, which difference affords the desired reserve. But, the flight speed required to produce the loading is some 77 m.p.h., which is scarcely in conformity with the flight speed appropriate to the design.

Let us, therefore, go to the other extreme and see what the 45 per cent. chart has to say. Here we find that the required loading is available at 42 m.p.h. and with it the power to carry about 23 lbs. per h.p. This appears to leave an admirable reserve, but in point of fact the wing angle itself is already beginning to be inefficient, and if it were made worse by trying to carry the specified loading at a lower speed the machine would soon have no more than 45 per cent. efficiency in reality, and the reserve for which it was designed would vanish altogether.

Once more, therefore, let us transfer our attention to another chart, and this time select for the purpose the 65 per cent. diagram where there is a more efficient wing angle and the loading is supported at 50 m.p.h. Here the weight per h.p. that can be carried at the same time is 29 and the argument is that we are only going to carry 17½. Here, however, the question "how?" arises, because $\epsilon = 65$ per cent. is already a modern basis for biplane design and it must be remembered that at least the major portion of the numerical value results, not from an arbitrary choice, but from sheer necessity arising out of the weight of the structural parts. The Maurice Farman, which designs for $\epsilon = 46$, and demonstrates 58 per cent. at 55 m.p.h. when weighed, under Military Trial conditions (and an aeroplane that cannot carry the regulation load has a very limited field), 26·8 lbs. per h.p. In this case, therefore, the attempt for a low ϵ was directed towards a low loading; the large wing area reducing this factor to less than 3 lbs. per sq. ft. For a machine of this type, therefore, a loading of 3½ lbs. per sq. ft. already begins to be high and a load per h.p. of 17½ is a doubtful accomplishment.

Thus, it is all very well to say: "I will build a machine to such-and-such loading and such-and-such weight per horse-power"; but it does not by any means follow that the selected values represent a reasonably possible venture. To materially reduce the value of ϵ, by modifying a machine already possessing a high demonstrated efficiency, is a performance requiring no little skill, and deserving therefore of no little credit; and, in so far as the factor of safety is the first vital consideration at stake when a move is made in this direction, we look with an appreciative eye on the general principles underlying Mr. Bradshaw's argument, although, as we have endeavoured to explain, we are not perhaps quite unanimous as to the numerical details with which it is illustrated. With his contention—that the factor of safety is at the root of his argument—however, we are entirely in accord; and, if what he has said serves to raise a useful discussion on the subject, it will have well fulfilled its purpose.

FLIGHT

AEROPLANES IN THE ARMY MANŒUVRES.

AT the end of last week an important Memorandum was issued from the War Office by the Director of Military Operations, on the value of aeroplanes in warfare and the use to which these machines are being put during the East Anglia Army Manœuvres. Since its issue, the temporary prohibition of the use of monoplanes has been announced.

The Memorandum is as follows:—

"1. There can no longer be any doubt as to the value of airships and aeroplanes in locating an enemy on land and obtaining information which could otherwise only be obtained by force. All the principal Powers, therefore, are expending much energy and money in the development of an air service for employment with their land and sea forces in war.

"This air service is, in our case, provided by the Royal Flying Corps, which consists of a Naval Wing, a Military Wing, and a Central Flying School, the latter being a school common to the two services where fliers, both officers and men, can be trained.

"The two wings not only have a common school, but, as far as their different functions permit, are organised on similar lines. In addition, a reserve of fliers common to both is being built up.

"2 In this year's Army manœuvres each force will be provided with a detachment of the Royal Flying Corps, consisting of:

"One aeroplane squadron (about eight aeroplanes).

"One airship detachment (one or two airships).

"The Naval wing is providing a flight of four aeroplanes for one of the aeroplane squadrons, while a proportion of the *personnel* employed with the airships will also be drawn from that wing.

"The employment of both airships and aeroplanes on the manœuvres this year must be looked upon as experimental. The aeroplanes used will be of many types, both monoplanes and biplanes, while the airships employed have been constructed with a view to the training of the *personnel*, and not for war. Moreover, the transport is of an improvised nature, and for this reason the aircraft must largely depend upon fixed depôts for repairs and maintenance.

"3 The detachment of the Royal Flying Corps forming the Air Service with each force will be under the immediate orders of the Commander, who will employ it in co-operation with the other arms, and more particularly with the cavalry for obtaining information as to the movements of the hostile force.

"Primary Task.

"Though aircraft will probably have several uses in war, their primary duty is searching for information, and consequently their alliance with cavalry will be of a close character. It may even be said that the use or misuse of aircraft will affect the action of the masses of an army in so far as it helps and influences the uses to which the cavalry is put. The view, however, which is sometimes put forward that, as aeroplanes and airships possess a power of reconnaissance superior to that of cavalry, the *raison d'être* of cavalry has ceased to exist, is erroneous. The work of cavalry will undoubtedly be greatly aided by a well-trained aeronautical service, but, except to a certain extent in long-distance reconnaissance, aircraft can in no way replace or revolutionise its action. The commander who has to his hand more actively co-operating and highly organised, equipped and trained cavalry and air services than his opponent should, even with numerically inferior forces, be far on the road to success.

"The three *rôles* whereby cavalry can help its infantry main columns in war are:

"1. Gaining information;

"2. Affording protection; and

"3. By action on the battlefield.

"The uses directly affecting cavalry and thus, indirectly, the main masses of the Army to which aircraft may advantageously be put, have little to do with the last two and occur almost entirely in connection with the first, namely, information. They may be roughly classed in order of importance as follows: strategical reconnaissance, tactical reconnaissance and the service of intercommunication.

"Wide Reconnoitring Range.

"As we know, the value of information depends to a great extent on the length of time that has elapsed since the events occurred to which it relates. As regards strategical reconnaissance, a General is probably now justified in requiring a well-trained flyer, flying a modern aeroplane, to reconnoitre some 70 miles out and return 70 miles. This would be done at a speed of, say, 60 miles per hour in ordinary weather over ordinary country. Thus, within four hours, allowing a wide margin, a report as to the approximate strength, formation and direction of movement of the enemy, if he is within a 70-mile radius, should be in the hands of the commander.

"A similar result would probably take officer's patrols, sent out from the strategic cavalry, at least three days, while the prospects of acquiring the information would be less.

"Turning to tactical reconnaissance. The aeroplanes will be ready to undertake a tactical reconnaissance of, say, three hours' duration, whether to obtain information of the enemy's position and movements (when in such close touch that the cavalry can no longer advance), to ascertain the nature of the ground to the front, flanks and rear of a position, with a view to subsequent movements or to find suitable targets for the artillery.

"As regards the service of intercommunication. This includes the transmission of information between forces, help in the co-operation of all arms and also the supplementing of the telegraph and telephone services in obtaining news of what is happening during a battle when the front covered is wide and roads and other communications are blocked or difficult.

"Reports of Observers.

"4. During the present manœuvres, the reports of the aerial observers will only be communicated to commanders through the responsible umpires, who will judge from the information as to height maintained during flight, &c., supplied by the observers, as to how far they would have been successful in war in obtaining the details contained in their reports.

"Umpires with troops have instructions to observe the action of hostile aircraft, and should the latter, in their opinion, have been exposed to the fire of the troops at effective ranges, they will report at once to their Chief Umpire to that effect.

"5. In addition to the aeroplanes with each force, some aeroplanes will be at the disposal of the Director of Manœuvres for observing and intercommunication purposes."

AIRCRAFT AT THE BRITISH MANŒUVRES.

FOR the first time aeroplanes and airships have seriously taken part in the British Army manœuvres, and the work accomplished by both types of aircraft in East Anglia during the past fortnight has demonstrated the revolutionary importance which attaches to their use in military operations. The airships, "Beta" and "Gamma," both renovated and considerably improved, and the "Delta," a new ship designed as a result of the experience obtained by its predecessors, together with a score of various types of aeroplanes, have been employed daily in reconnaissance work, and have been the means of obtaining most valuable information as to the disposition, &c., of the "enemy's" forces. It is impossible to give reliable details of all the work which was accomplished, by reason of its official nature, but there are one or two achievements which stand out prominently. Lieut. Spencer Grey on his monoplane on Thursday last week, accompanied by a bluejacket, went from Hendon to Cambridge in 55 mins., and on the following day Lieut. Longmore arrived from Oxford after a 65-min. trip. In the afternoon, Lieut. Fox took Major Sykes over to Thetford, and Commander Samson, Capt. Raleigh, Lieut. Malone, and Lieut. Spencer Grey each made good flights.

In view of the order from the War Office on Saturday suspending the use of monoplanes, two biplanes piloted by Lieuts. Mackworth and Longcroft were sent from Farnborough to Cambridge. Another arrival was Capt. Gordon, from Eastchurch, who had flown to within a short distance of Cambridge on the previous evening, and had then been forced to land owing to the gathering darkness. Col. Cody started to fly from Aldershot, but landed at High Wycombe, while Lieut. Barrington-Kennett, with Serjeant Hunter as passenger, landed in a mist near Letchworth. During Saturday, Commander Samson with Lieut. Malone and Lieut. Fox each made reconnaissances lasting nearly three hours. On Monday, no less than twenty-seven aeroplane flights were made, each averaging about 70 miles. One of the "Red" machines did a trip of 190 miles, while the best flight to the credit of the "Blues" was 150 miles. Col. Cody arrived during the day and took Major Sykes up for a trip of an hour and a-quarter. The "Blues" had the misfortune to lose two of their machines, one having to come down for adjustments, and the other landed to render assistance, both being captured by a detachment of hussars. Col. Cody, on the "Blue" side, was out early on Tuesday morning, and at 6 a.m., after a circuit round Cambridge, scouted to the eastward.

On Friday, the three airships left Farnborough, and "Gamma" safely reached the camp at Kneesworth, Cambridgeshire, but the other two had to put back. The "Delta," later, was able to get to Thetford, Norfolk, and on Sunday the "Beta" arrived at Cambridge. Both the "Gamma" and the "Beta," the former with the "Blue," and the latter with the "Red" Army, were continually cruising over the battle area on Monday and Tuesday.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 17th inst., when there were present:—Sir Charles D. Rose, Bart., M.P., in the Chair, Mr. Griffith Brewer, Mr. G. B. Cockburn, Col. H. C. L. Holden, C.B., F.R.S., Prof. A. K. Huntington, Mr. F. K. McClean, Mr. Alec Ogilvie, Mr. C. F. Pollock, Mr. R. W. Wallace, K.C., and the Secretary.

New Members.—The following new members were elected:—Major Edward Bailey Ashmore, M.V.O., R.F.A., Owen Bulmer Howell, Capt. C. D. Johnson, M.V.O., R.N., Leslie Percy Langton, and Douglas G. Young. Total membership to date, 1,435.

Aviators' Certificates.—The following aviators' certificates were granted:—

288. Lieut. Philip Shepherd, R.N. (Short Biplane, Central Flying School, Upavon).
289. I. G. Vaughan-Fowler (Wright Biplane, Eastchurch).
290. Lieut. G. Wildman-Lushington, R.M.A. (Short Biplane, Central Flying School, Upavon).
291. John Laurence Hall (Blériot Monoplane, Blériot School, Hendon).
292. Samuel Summerfield (Bristol Biplane, Bristol School, Brooklands).
293. Edward Wallace Cheeseman (Bristol Biplane, Bristol School, Brooklands).
294. Assistant Paymaster George Stanley Trewin, R.N. (Bristol Biplane, Central Flying School, Upavon).
295. Ernest Frank Sutton (Caudron Biplane, Ewen School, Hendon).
296. Lieut. John Wilfred Seddon, R.N. (Short Biplane, Naval School, Eastchurch).
297. Harry George Hawker (Farman Biplane, Sopwith School, Brooklands).
298. Lieut. A. C. Holms MacLean (Bristol Biplane, Bristol School, Brooklands).
299. Capt. Charles L. Price (Bristol Biplane, Bristol School, Brooklands).
300. Lieut. G. B. Stopford, R.F.A., (Bristol Biplane, Bristol School, Brooklands).
301. G. W. England (Bristol Monoplane, Bristol School, Salisbury Plain).

Letter from the Aero Club de France requesting the club to give its sanction to the granting of an aviator's certificate to Lieut. Barry Martyn of the Wiltshire Regiment was considered, and the necessary permission granted.

Letter from the Aero Club of America requesting the club to give its sanction to the granting of an aviator's certificate to Mr. Alexander C. Beech was considered, and the necessary permission granted.

Public Safety and Accidents Investigation Committee.—On the motion of Mr. R. W. Wallace, seconded by Mr. C. F. Pollock, the following report of this committee was unanimously adopted:—

Meetings were held on August 20th, 1912, and September 4th, 1912, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. G. B. Cockburn, Capt. J. D. B. Fulton, R.F.C., Mr. J. H. Ledeboer, Mr. W. O. Manning, Maj.-Gen. R. M. Ruck, C.B., R.E., Com. C. R. Samson, R.N., Staff-Surgeon H. V. Wells, R.N. In attendance, Mr. R. L. Charteris and the Secretary.

ACCIDENT ON SALISBURY PLAIN.—Report on the fatal accident to Mr. Robert Cooke Fenwick, when flying on Salisbury Plain, on Tuesday, August 13th, 1912.

Brief Description of the Accident.—Mr. R. C. Fenwick, flying on a Mersey monoplane fitted with a 45-h.p. Isaacson engine, had been in the air about two minutes, and, when about 200 ft. high, was seen to be in difficulties. The aircraft dived for about 50 ft., recovered an even keel, and then made a vertical dive to the ground. The aviator was killed instantaneously.

Report.—The Special Committee met at Larkhill Camp, on Tuesday, the 20th August, 1912, and heard the evidence of several eye-witnesses. The Committee also received the report of the designer and manufacturer of the aircraft.

From the consideration of this evidence, the Committee is of opinion that the following facts are clearly established:—

(1) That the aircraft was the first of its type to be constructed.

(2) That the accident originated while the aircraft was at about 200 feet from the ground.

(3) That the aircraft was unstable fore and aft and not easily controlled.

(4) That there is no reason to believe that any part of the aircraft broke whilst in flight.

(5) That the aircraft, which had started two minutes before in a calm, flying in the direction of Fargo Wood, was struck by a gust, dived, straightened out and again dived, from which dive it never recovered, the aircraft striking the ground beyond the perpendicular. The aircraft was completely smashed and the pilot killed on the spot.

(6) The wind rose very suddenly, as shown by the wind chart, at about the time of the accident.

(7) The examination of the aircraft immediately after the accident showed all the control wires to be intact.

(8) Mr. R. C. Fenwick was granted his aviator's certificate, No. 35, on November 29th, 1910, by the Royal Aero Club.

Opinion.—The Committee is of opinion that the cause of the accident was primarily due to the instability of the aircraft, which made it difficult to control in a disturbed atmosphere. That the point where the accident occurred is well known to be one where irregular disturbances of the air are prevalent under certain wind conditions. One of these disturbances must have struck the aircraft, and the aviator eventually lost control.

BROOKLANDS ACCIDENT.—Report of the fatal accident to Mr. C. Lindsay Campbell, when flying at Brooklands, on Saturday, August 3rd, 1912, at about 6.20 a.m.

Brief Description of the Accident.—Mr. C. Lindsay Campbell was flying on a Bristol monoplane at Brooklands, on August 3rd, 1912, at a height of about 300 ft., when the engine was observed to stop. The machine shortly afterwards dived about 200 ft., but straightened out. A second dive, however, followed. The machine struck the ground, and Mr. Lindsay Campbell received fatal injuries.

Report.—The Special Committee sat on Tuesday, August 20th, 1912, at Larkhill, Salisbury Plain, and heard the evidence of Mr. R. L. Charteris. Written reports of eye-witnesses were also considered.

From the consideration of this evidence the Committee is of opinion that the following facts are clearly established:—

(1) That the accident originated, at a height of about 300 ft., by the aviator keeping the machine in a horizontal position after the engine had stopped, thereby losing flying speed.

(2) That the aircraft then side-slipped, but on diving regained speed and recovered its normal flying position. The engine, at this point, gave a few intermittent explosions, but failed to pick up, and the aircraft being again held in a horizontal position once more underwent a side slip and vertical dive, hitting the ground at a steep angle.

(3) That there is no reason to suppose that the structural failure of any part of the aircraft was the cause of the accident.

(4) That the aviator was not thrown out of his seat and was not wearing either belt or helmet.

(5) Mr. C. Lindsay Campbell was granted his aviator's certificate No. 220, on the 4th June, 1912, by the Royal Aero Club.

Opinion.—The Committee is of opinion that the accident was due to the aviator failing to appreciate the danger of keeping the aircraft in a horizontal position after the engine had stopped, thereby losing flying speed and control of the aircraft.

The Committee is also of opinion that since that portion of the aircraft in which the aviator was seated was undamaged, his life might have, perhaps, been saved had he used a helmet and belt, as his injuries were caused by his being thrown violently forward against the structure.

It was unanimously resolved that these reports be forwarded to the Executive Committee with a recommendation that they be published in extenso.

LIEUT. W. PARKE'S DIVE AT SALISBURY PLAIN ON AUGUST 25TH, 1912.—At the invitation of the Committee, Lieut. Wilfred Parke, R.N., attended before the Committee and fully explained the circumstances of his dive on the Avro biplane on August 25th, 1912. He added that the description of the occurrence, which appeared in FLIGHT, August 31st, 1912, was quite correct, and that he agreed with the writer's deductions as a whole.

It was decided to recommend to the Executive Committee, that the Advisory Committee for Aeronautics be approached with a view to certain experiments being carried out to obtain definite information concerning the conditions under which the shifting of the centre of pressure may occur, the effect of covering in the fuselage on various types of aircraft, and the effect of the position of the rudder and elevator.

It was further decided to recommend an expenditure not exceeding £50 for these experiments.

Military Aeroplane Competition.

The Chairman of the Club has received the following letter from the War Office :—

"War Office, London, S.W.,
September 10th, 1912.

"SIR,—I am commanded by the Army Council to request that you will convey their thanks to Mr. H. E. Perrin, the Secretary of the Royal Aero Club, for the very able services rendered by him in the assistance of the Judges' Committee in the Military Aeroplane Competition held on Salisbury Plain last month.

"I am, Sir,
"Your obedient Servant,
(Signed) "R. H. BRADE."

Public Safety and Accidents Investigation Committee.

A meeting of this committee was held on Tuesday, the 17th inst., at 3 p.m., when there were present :—Col. H. C. L. Holden, C.B., F.R.S. (in the Chair), Mr. A. E. Berriman, Mr. G. B. Cockburn, Mr. J. H. Ledeboer, Mr. F. K. McClean, Mr. W. O. Manning, Mr. Alec Ogilvie, Sir Charles D. Rose, Bart., M.P.

The Committee proceeded to enquire into the fatal accident to Lieuts. Hotchkiss and Bettington on a Bristol monoplane at Wolvercote, near Oxford, on September 10th, 1912, and heard the evidence of witnesses. The representatives of the British and Colonial Aeroplane Co., Ltd., attended before the Committee and produced plans of the aircraft and gave evidence on various points.

The enquiry was adjourned until Friday, the 20th inst., to enable further details to be obtained regarding certain points raised in the evidence.

Late Lieuts. Hotchkiss and Bettington.

In response to messages of sympathy, the Chairman of the Club received the following telegrams :—

From Major F. H. Sykes, Commandant of the Military Wing of the Royal Flying Corps :—

"We all thank you and Members of the Royal Aero Club for your sympathy in our great loss."

From Sir George White, Bart., chairman of the British & Colonial Aeroplane Co., Ltd. :—

"Thank you for kind telegram. We have indeed sustained great loss in lamentable death of Mr. Hotchkiss so long associated with us as one of our school managers. We know that high sense of duty and devotion to his country alone induced him to volunteer as an officer of the Army Flying Reserve."

British Empire Michelin Competitions.

Intending Competitors are again reminded of the following prizes :—

British Empire Michelin Cup No. 1... ... £500 Prize.
British Empire Michelin Cup No. 2... ... £600 Prize.

The Competition for No. 1 Prize closes on October 31st, 1912, and No. 2 on October 15th, 1912.

The rules can be obtained on application to the Secretary.

Aviation Insurance.

The Committee has had under consideration the whole question of Insurance against Risks to which aviators are exposed. Several interviews with underwriters at Lloyd's have taken place, and the Club approved the terms and conditions of a policy to cover all or any of the undermentioned risks : Accidental damage to machines ; third party liability ; fire ; transit ; personal accident. The policy is known as the Primus policy, "officially approved and recommended by the Royal Aero Club of the United Kingdom." Particulars may be obtained on application to Bray, Gibb and Co., Ltd., 166, Piccadilly, London, W., or Matthews, Wrightson and Co., Ltd., 39, Old Broad Street, London, E.C.

166, Piccadilly. HAROLD E. PERRIN, Secretary.

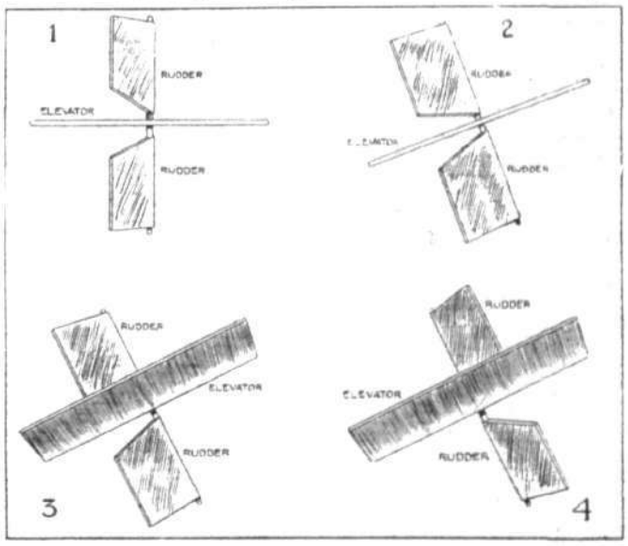
THE ELEVATOR ACTION OF THE RUDDER.

ARISING out of the accident to Lieut. Parke, when he made his famous dive, is a problem concerning the interchange of rudder and elevator actions, which, although known to many, may be new to several readers of FLIGHT, and it is, very appropriately, referred to by one of our correspondents, Major Brocklehurst, this week. In order to explain it he has prepared a set of simple diagrams, the first of which shows the rudder put over to the pilot's left, in order to turn to the left by the rudder action alone. In the second diagram it is assumed that the increase in peripheral speed of the outer wing, accompanying the turn, causes the machine automatically to bank. The rudder is now tilted sideways, and there is a small vertical component of the air pressure on its face. In fine, the rudder has begun to be an elevator.

Let us now assume that the condition is exaggerated to the point at which the machine is banked to 45°. The lateral and vertical components of the pressure are now equal, and the rudder plane is just as much an elevator as it is a rudder.

The consequence of the combined effect is to make the tail swing upwards and outwards, thus promoting a dive. It is, therefore, reasonable to suppose that the elevator itself will now be put up to check the dive, in which case, the elevator being likewise tilted at 45° from its normal position, acts as much as a rudder as it does as an elevator. So, although it may neutralise the elevating effect of the rudder, it is only by the difference in their respective areas that it will be able to actually depress the tail. If the bank is less than 45°, as it would be of course in practice, the disparity of its influence is less marked, but, in any case, it augments the ruddering effect and so tends to lock the machine in its spiral path, which, if the speed increases, will augment the natural bank until it may in fact approach to the value of 45°. On a steep spiral path, it is by no means easy to say exactly how much the machine is really banked, but it would appear as if it may easily introduce conditions analogous to an excessive amount, so far as they influence the action of the tail in the manner above described.

It is at any rate clear that the rudder must no longer be maintained in the positions shown in diagrams 1, 2, 3 (on this page) once the machine has assumed a high velocity downwards. By throwing the rudder over to the pilot's right, *i.e.*, ruddering outwards from the spiral, both the ruddering and the elevating effects produced by the rudder plane are immediately reversed, that is to say, the rudder not only tends to straighten the flight path, but to reduce the steepness of the descent. This influence, although perhaps comparatively small in itself, is augmented by the action of the elevator proper,



which is already in position for depressing the tail, it is not surprising, therefore, if an instantaneous flattening out of the machine follows this operation of the control. Any tendency to straighten the flight path likewise tends to obliterate the bank, which in turn tends to restore the elevator to the full exercise of its normal function.

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Flying in Ireland.

ON the 11th inst. M. Salmet visited the horse show at Lurgan, co. Antrim, and gave an exhibition flight on his Blériot. By way of consolation for the disappointment caused by the non-arrival of the competitors in the recent Dublin to Belfast event, some 20,000 people witnessed in Belfast, on Saturday last, some very good flying by M. Salmet on his Blériot, Mr. Astley also on a Blériot, and Mr. Valentine on a Deperdussin. The flights were made from the Balmoral Show ground, and the proceeds were devoted to Belfast charities.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Ground.

MONDAY, Tuesday and Wednesday last week very little was doing on account of manœuvres, the army accidents and weather. Thursday, Lieut. Hewlett, with Lieut. Berne as passenger, put in a fair amount of flying on No. 38. Later on the same machine and pilot, with Gunner Bobbett as passenger, did several circuits of the island. Lieut. Seddon doing circuits on No. 34 school biplane preparatory for *brevet* flight, the first half of which Lieut. Seddon did before breakfast on Friday morning, finishing the second half in the afternoon. Lieut. Gregory out flying school machine. Capt. Gordon started for Hardwicke on T 5, which had been in for repairs to damage caused on last trip *en route* to Hardwicke. He arrived close to Cambridge on Friday night, and proceeded early on Saturday to Hardwicke Camp. Lieut. Berne, Gunner Bobbett, F. R. A. Deacon all taxying school machine.

Saturday. Lieut. Hewlett, with Lieut. Berne as passenger, flew No. 38 to Dover, and returned early next morning, having rather a trying time with the fog. Lieut. Parke on Short monoplane.

Monday. Lieut. Parke out on Short monoplane for a few circuits found machine somewhat difficult to steer while taxying.

Tuesday. Mr. Alec Ogilvie flew N.E.C.-engined Wright machine to Leysdown, where it was fitted with floats, and on second attempt successfully left the water, and after having "watered" once or twice, flew back to the aerodrome, and "landed" on the floats without a scratch to same.

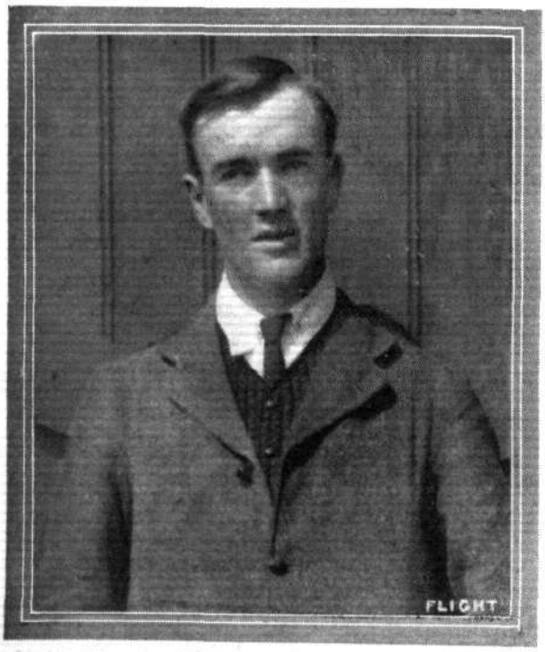
Brooklands Aerodrome.

ON Monday morning, last week, the weather was too bad for any school work. Mr. Sabelli, on the Hanriot, flew back from Hendon in 20 mins. at an altitude of 2,000 ft. In the evening the weather conditions were much more favourable. At Bristol school both Mr. Merriam and Mr. Bendall were giving tuition to Capts. Reed and Gibbon, Lieut. Stopford and Mr. Hall. Pupils flying alone were Capts. MacDonnell and Price, Lieuts. Penn Gaskell, Glanville, MacLean and Mr. Payze, all having two turns each. Mr. Merriam, up over 1,000 ft., made a splendid spiral *vol plané* with engine cut off, thus finishing the evening's work.

Mr. England, of Bristol school, out first Tuesday, trying conditions and then testing solo machine. Mr. Bendall up, giving instructions to Capt. Gibbon, and Mr. Merriam with Capt. Reed, afterwards up sitting behind Lieut. Loutcliffe on straights. Lieut. Stopford, alone, flying well. Capts. Price and MacDonnell, Lieuts. Glanville, Penn Gaskell, MacLean and Mr. Payze flying straights, all having two turns each.

Bristol School, Friday. Mr. Merriam testing new solo machine. Too windy for pupils. Mr. Sippe and Mr. Sabelli out on Hanriot both flying well.

Saturday morning at Bristol School. Messrs. Merriam and Bendall out with many pupils, the weather being ideal for flying.



Mr. I. Guy Vaughan-Fowler, who obtained his pilot certificate at the Royal Aero Club Flying Grounds, Eastchurch, on August 30th, on Mr. Alec. Ogilvie's N.E.C.-engined Wright machine.

Mr. Darracq made his two first circuits splendidly and landed nicely. Other pupils flying alone were Capt. Price, Lieuts. Stopford, Glanville and Penn Gaskell and MacLean. Mr. Payze making good straights, unfortunately wheel came off breaking propeller. On the Hanriot Mr. Sippe out flying high. In evening all Bristol pupils out after Mr. Merriam and Mr. Bendall testing conditions.

At the Hanriot School, Mr. Sabelli and Mr. Sippe both putting in good work on monoplane.

Saturday morning, the Bristol School were as busy as usual, Mr. Merriam and Mr. Bendall taking up passengers for tuition. Captain Price and Lieut. MacLean took their *brevets* in excellent style and both landing well. Lieuts. Glanville, Penn Gaskell, and Captain MacDonnell doing figures of eight. These pupils are flying perfectly, and can take their certificates any time they wish. In evening there wasn't a lot of flying got through owing to being rather bumpy. Mr. Barnwell was on Avro monoplane (enclosed type). The points of skid whilst starting a straight flight stuck into the ground, the machine then turned turtle, the pilot fortunately crawled out unhurt. Messrs. Sippe and Sabelli, on Hanriot, out for 20 and 15 minutes' duration, flying around Chertsey and Byfleet at over 1,000 ft.

Sunday afternoon saw a good number of spectators, which reminded one of the good old Brooklands days. Mr. Spencer on his biplane gave a splendid exhibitional flight. Mr. Merriam, manager of the Bristol school, also followed with some very pretty flying, Mr. Bendall making, too, a very good show. Messrs. Sippe and Sabelli were as usual also flying the Hanriot. Then competition for bomb dropping nearest the mark and landing; Mr. Sopwith first in landing nearest the mark, and Mr. Merriam second. Mr. Spencer being first for bomb dropping, and Mr. Sopwith second. Afterwards school work in earnest by all.

Vickers School.—Mr. Barnwell was out Tuesday last week on No. 5; as it was only his second flight on this machine, he surprised everyone by taking her up to 1,200 ft. and flying in good style out over the surrounding country. He appeared to handle the machine easily in a somewhat gusty wind. Capt. Stott was doing straight lines for half-an-hour, and showed a slight improvement.

Thursday, Knight was on the Vickers-Farman, and put in a few circuits very creditably, the wind being very nasty. Next day Macdonald took No. 6 in the early morning, for a couple of longish flights, carrying pupils for instruction. Knight was giving a new pupil, Lieut. Babington, R.N., his first lesson on the Vickers-Farman. Lieut. Babington was out later in the day rolling on No. 3, and doing very well for his first attempt on a machine. Mr. Barnwell and Mr. Geere were both at work on No. 5, Mr. Geere achieving his first circuits, handling the machine in very promising fashion. In the afternoon and evening, Macdonald climbed with passengers up to over 2,000 ft.—as usual eschewing a mere aerodrome, making wide circuits, all over the surrounding country. Knight was also getting in circuits on No. 5, at a good height, whilst Capt. Stott was plodding away with straight lines.

Macdonald, on No. 6, was taking up sundry passengers. On Saturday and Sunday he was, as usual, on No. 6, again with passengers, amongst them Major Astley Cubit, whom he turned from an adverse critic of aviation, into an enthusiastic partisan—the way in which the machine was handled and her absolute steadiness in the air quite altering his ideas as to the dangers of flying. Capt. Stott was doing straights in the morning until he broke his propeller. The same pupil in the evening, while doing straights, suddenly stood the machine on its nose. He appears to be a very slow learner, and, considering the amount of practice and tuition he has had, one would expect him to have passed this stage long ago. Knight was on No 5, testing an English built R.E.P. motor, which seemed to be going well.

Eastbourne Aerodrome.

THE long-promised improvement in the weather has at last arrived, and Eastbourne experienced five fine days in succession last week. Friday morning was dead calm, and Messrs. Foggin and Gassler took full advantage of it; both made excellent progress, Gassler doing one particularly good circuit. About midday Mr. Fowler was on the Gnome-Blériot, but found the air full of *remous* and soon came down. In the afternoon Mr. Hammond took up one of the school mechanics, and came down from a height of 1,000 ft. with one of his sensational spiral *vol planés*. Gassler was again on the 28-h.p. Anzani, but unfortunately damaged the machine rather badly by running into a bank when he landed. Later on instruction on the Bristol had to be abandoned, as the engine began to give trouble, and Mr. Fowler decided to have it changed.

Saturday was another perfect flying day, and Mr. Hammond had a busy afternoon. Mr. Napier, who, with Mr. Bode Roberts, has joined the school this week, received his first lesson. Lerwill had several tuition flights, and Mr. Chapman was given a passenger

flight which created some excitement, Mr. Hammond passing right over Devonshire Park while the tennis tournament was in progress. The Bristol was behaving splendidly with the new engine, and Mr. Hammond, who is a magnificent stunt flyer, showed the machine off to its best advantage. Mr. Fowler also made several flights on his Blériot.

Sunday again was a busy day, Messrs. Hammond, Fowler and Yates all being out. Mr. Hammond made one particularly fine flight, carrying Mr. Napier as passenger. He was up for an hour and a quarter, during which time he passed right over Bexhill, and at one time climbed to over 5,000 ft., the machine being lost to view in the clouds.

Monday was another good day, and Mr. Yates successfully passed the tests for his *brevet* in the evening, making uncommonly good time, his average time for each figure eight being two minutes. Mr. Fowler gave two exhibition flights in the afternoon.

Tuesday was quite calm but very foggy, and Mr. Fowler, who flew over in the morning to visit some friends about 14 miles away, got completely lost on his return journey, eventually striking the coast between Bexhill and Hastings. Mr. Lerwill was out on the Bristol, and Mr. Bode Roberts was initiated into the mysteries of the Anzani.

Liverpool Aviation School, Waterloo.

TUESDAY, last week, the new school machine fitted with Y engine was tested, but owing to an air lock in the oil pipe no flight was attempted. Melly started next day on the two-seater, but the wind proving very unsettled he landed after flying a mile up the beach and flew back to the hangars. On Thursday he started again on the two-seater in ideal flying weather to reach the Wirral Flower Shower in Cheshire, but after miles across country the engine starting missing badly and he landed in a field adjoining Aintree Racecourse. At mid-day, after changing one plug, he started again with the intention of returning to Waterloo, and on approaching the shore realised that the tide was up and as there was no possibility of landing there he turned back inland and landed again at Aintree. As the engine was still missing it was inadvisable to proceed farther, and at 3 o'clock he returned to Waterloo. In the evening Melly took out the new Y-type Anzani without any tuning up and made an extended figure 8 about 100 ft. up, planing down with the engine switched off in great style. On Monday, he on the two-seater, did a fine figure 8 and found the engine in perfect working order. He then took out Y engined machine, and after doing a figure 8 handed it over to Birch, who, after one or two straights did a series of figure 8, being in the air 10 mins. and planing down with the engine switched off in perfect style.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, school opened at 6 a.m. under superintendence of Mr. Lewis Turner, T. P. H. Bayetto, a new pupil receiving instruction in controls previous to rolling, on 25-h.p. Blériot. In the evening E. J. Howard-Wright (new pupil) out with instructor (Mr. Turner) for tuition in rolling and straight flights on G.W. biplane. Capt. Kunhardt and Lieut. Allen straight flights on G.W. biplane. Messrs. Hoelscher and Wilson straight flights on same machine. Mr. Roupell doing circuits on 35-h.p. Blériot.

School opened Friday at 6 a.m., with calm weather. Messrs. Fuller, Small, and Wilson doing straights. Mr. Roupell 20 minutes on 35-h.p. Blériot, straights and circuits. Lieut. Small, straights on G.W. biplane. Mr. Wilson rolling on same machine. Wynne out for *brevet* on G.W. biplane, but only succeeding in making one figure 8. Lieut. Allen and Mr. Hoelscher, straights. Capt. Kundhardt rolling on G.W. biplane. Commander Yeats-Brown, straights on G.W. biplane. Kunhardt out with instructor, Mr. L. Noel, doing straights. Messrs. Yeats-Brown, Small, Wilson and Allen doing straights. Commander Yeats-Brown making circuits 15 minutes. In the afternoon Bayetto rolling on 25-h.p. Blériot. Wynne circuits on G.W. biplane. Fowler rolling and straights, and Bayetto rolling, both on 25-h.p. Blériot. Lieut. Allen on G.W. biplane. In the evening Commander Yeats-Brown doing figure 8 on G.W. biplane. Mr. Lan-Davis rolling on 25-h.p. Blériot. Capt. Kunhardt rolling on biplane. Mr. Roupell circuits on 25 Bleriot.

Weather calm on Saturday, school opened at 6.30, under Mr. Turner. Mr. Roupell out on Blériot doing circuits. Same pupil out again at 7.50 doing straight flights. Lan-Davis rolling on Blériot.

At 3.30 p.m. on Sunday Mr. L. Turner made a fine exhibition flight on H. Farman 70-h.p. machine. Out again immediately after on same machine with Lady E. O. Lambert as passenger. Some fine flights were made by Mr. M. Desoutter on his 50-h.p. Blériot, the machine being fitted with a Klaxon electric horn with which he sent messages by Morse code. Mr. Gordon Bell was on 35-h.p. Deperdussin. Mr. S. Pickles made a fine altitude flight on Caudron biplane, 35-h.p., and Mrs. Stocks was on the 35-h.p. Anzani-Blériot. Mr. Hall on 50-h.p. Blériot and Mr. Blackburn doing circuits on G.W. 50-h.p. biplane. Capt. Reynolds and Major Moss left for Cambridge. Messrs. Turner and Noel were busy all the afternoon and evening until dusk carrying passengers.

Blériot School.—Monday last week Messrs. Sacchi, Gandillon, Reilly and Teulade were all practicing and taking advantage of a fine evening, put in some very good work. Mr. Hall was also flying his 50-h.p. Gnome-Blériot in good style. No school work possible for the next three days. M. Pierre Gratien, a new pupil, joined the school on Tuesday.

On Friday, the 13th, despite the fact that both the day and the date betokened a probability of bad luck, an excellent day's work was accomplished. Messrs. Teulade and Clappen doing very good straights on LB 3; M. Gandillon, having been promoted to LB 2, was proceeding to get off the earth for the first time by himself, and Messrs. Reilly and Gratien were doing straight rolls on LB 1.

Messrs. Welburn, Teulade and Clappen were all doing good straights on LB 3 on Saturday, M. Gandillon doing similarly on LB 2, and M. Gratien rolling on No. 1.

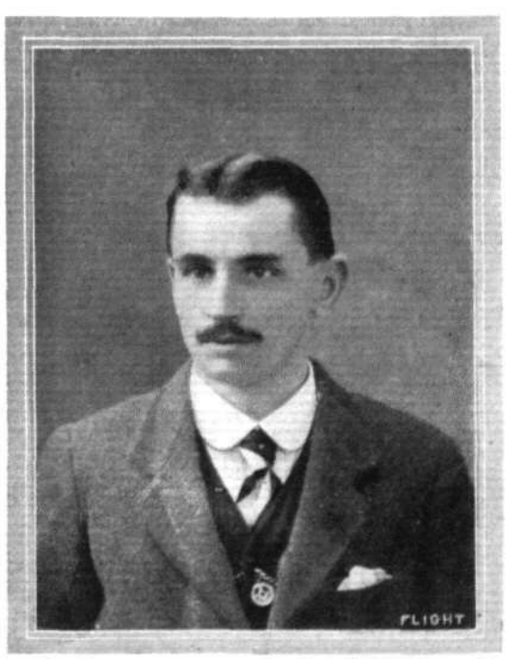
British Deperdussin School.—Wednesday or Thursday last week, no flying, too windy. Friday morning, Lieuts. Tucker and Hawker doing straights on *brevet*. Messrs. Phelps and Whitehouse also rolling on Taxi 1. Mr. Andrews made a bad landing and had nasty smash on *brevet*. Brock straight flights on racer.

Capt. Macdonell and Lieuts. Tucker and Hawker all doing straight flights on Taxi No. 2. Saturday, Messrs. Phelps, Whitehouse and Durand all rolling on Taxi No. 1. Cadet Robinson, straights on *brevet*, and Gill did two circuits on two-seater.

Monday, Capt. Macdonell and Messrs. Spratt, Durand, Phelps and Mapplebeck all rolling on Taxi 1.

Lieut. Tucker and Mr. Spratt making nice straight flights on Taxi 2, Tuesday morning, Messrs. Phelps and Mapplebeck rolling on Taxi No. 1. In the evening Capt. Macdonell and Lieut. Tucker straight flights on Taxi No. 2. Messrs. Spratt, Ware, Durand and Mapplebeck also doing straights on Taxi No. 2.

W. H. Ewen School.—On Monday, last week, pupils were out at 6.15 p.m. Following a flight by Mr. Ewen, Mr. Sydney Pickles went up on 35 Caudron biplane and in a flight of 30 minutes rose to over 1,000 ft. carrying out some effective banking and *vol planés*. Biplane then handed over to Messrs. Edmund and Sutton who each made several confident flights at about 50 ft. M. Baumann was out with monoplanes Nos. 1 and 2 and got some splendid results from the pupils. Messrs. Conran, H. James and Lieuts. Bayly and McMullen doing good straights on monoplane No. 1. Mr. Edmund on monoplane No. 2 made a very nice circuit and Capt. Chamier and Mr. J. H. James making good progress on same machine. To finish the day's work Mr. Ewen was again on the 35-h.p. two-seater Caudron biplane taking with him as passenger Master Lewin.



Mr. E. W. Cheeseman, a new Royal Aero Club pilot, who passed for his certificate on a Bristol biplane at Brooklands on September 7th.

Tuesday and Wednesday unfavourable weather precluded any possibility of outdoor work, and on Thursday the wind was still too high for pupils to be out. The 60-h.p. Caudron two-seater having been tuned up, M. Galy took it out for a trial flight. Rising to some 500 ft. he made several circuits flying surprisingly steadily considering the bad atmospheric conditions.

On Friday pupils turned up at 5 a.m., but the aerodrome was enveloped in thick fog. This cleared about an hour later, and Mr. Sydney Pickles after making a test flight on the 35-h.p. Caudron was instructing Messrs. Sutton, Edmund and Apcar on the same machine. Mr. Sutton went for his *brevet* tests on the Caudron and passed all in an excellent manner, flying most of the time at an altitude of 350 ft. Thereafter Messrs. Edmund and Apcar had some good flying practice. Mr. Sydney Pickles again made a beautiful flight on the Caudron reaching nearly 1,000 ft. at which height he switched off and executed a superb spiral *vol plané*. M. Baumann was hard at work instructing pupils on monoplanes Nos. 1 and 2. Lieuts. Bayly and McMullen and Messrs. Conran and H. James all making splendid progress in straight flights on monoplane No. 1, while Mr. L. Russell was doing some satisfactory rolling practice. Capt. Chamier and Mr. J. H. James were doing nice flights at 20 and 30 ft. on monoplane No. 2 and getting in good landings. After a very short spell for breakfast the school was out again from 10 till 1, and M. Baumann had his pupils out doing further good work on monoplanes Nos. 1 and 2. A faulty cylinder having been replaced, Mr. Sydney Pickles took the 35-h.p. Caudron up to 600 ft. on a test flight. He made a fine exhibition, landing *en vol plané*. The machine was then handed over to Mr. Edmund, who made two circuits flying very steadily. He proved the Caudron to be a strong machine, for notwithstanding he landed on one wing tip nothing whatever was broken. Mr. Apcar then mounted the Caudron and made several good flights at 20 and 30 ft. The wind which had risen slightly in the afternoon died down again towards 6 p.m. and all the above-mentioned pupils were out again putting in good practice. Mr. Sydney Pickles gave a nice exhibition on the 35-h.p. Caudron and Mr. Ewen was also out on same machine taking with him as passenger Mr. Travers.

On Saturday the school was out at 6 a.m. Mr. Sydney Pickles, after a good flight, handed the 35-h.p. Caudron over to Messrs. Apcar and J. H. James who each made several good flights. Mr. Edmund then did several circuits on the Caudron, flying very steadily and landing with fine precision. Mr. Ewen then gave passenger flights to Messrs. Gilbert, Tyler and Freshney. M. Baumann had Lieuts. McMullen and Bayly and Mr. Reic Conran, doing good flights and landings, while Mr. L. Russell was making rapid progress rolling on monoplane No. 1. Capt. Chamier and Mr. H. James were both doing splendid flying on monoplane No. 2.

"Flight" Copyright.

Mr. J. L. Hall, who is putting in such good work on his Blériot at Hendon, and who has just obtained his pilot certificate at the Blériot School.

Mr. Ernest F. Sutton, who has just passed for his Royal Aero Club certificate on a 35-h.p. Caudron biplane at the W. H. Ewen School at Hendon. Mr. Sutton, in addition to the Caudron, has been making excellent flights on both the school Blériot and the Dep. monoplane.

Salisbury Plain.

Bristol School.—There was no flying on Monday morning last week owing to the rain, Mr. Pixton going up for three flights in the evening, taking up Lieut. Hall and Jullerot. Mr. Jullerot was first out on Tuesday morning on a Bristol biplane, followed by Pixton on monoplane with passenger, both completing several circuits. Bad weather prevented any flying in the evening, and the same on Wednesday, Thursday, and Friday morning. Mr. Pizey was out in the evening, taking up Captain Penfold and Mr. Lywood on Biplane No. 19. Mr. Jullerot, with Lieut. Mehmet Ali, also on a biplane, after which the wind caused the machines to be brought in. Harrison was first out on Friday, taking up Mr. Lywood, Captain Penfold and Captain Lucena. Jullerot was also giving tuition flights to Lieuts. Fethe, Aziz, Mehmet Ali, Sofoet, Fazil, and Fabri. In the evening, Messrs. Pizey, Jullerot, and Harrison were all busily engaged in giving tuition flights. Pixton was first out on Saturday morning, followed by Pizey; Pixton out again on monoplane for tests, flying splendidly. Work resumed in the evening, when all the staff were out and quite a number of pupils. Pizey started first on Sunday for a solo, also Mr. Jullerot. Harrison out with Mr. Lywood, Capt. Penfold, and Capt. Lucena. Jullerot taking another machine, and making a number of passenger flights. Pixton took one of the Bristol monoplanes for further tests. School very busy in the evening, quite a large number of flights being made.

Royal Flying Corps.—Owing to the absence of officers and men at manœuvres there is practically nothing to report. On Thursday week Lieut. Gordon Bell was testing the 80-h.p. Deperdussin monoplane with a view to flying to Hardwicke but had to postpone the trip owing to engine trouble. The next morning further tests were made, but the engine still misfiring, the proposed trip was abandoned. The temporary sheds put up for the Trials are now being taken down.

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THE LINDSAY CAMPBELL FUND.

JUST before sailing from Cardiff on the s.s. "Western Australia" on Wednesday, Mrs. Campbell sent the following letter to FLIGHT:—

"May I thank through your columns, your paper and Col. Massy, Vice-Chairman of the Aerial League, for all his goodness and hard work on my behalf. It is impossible to express adequately what I *do* think."

The fund eventually totalled £333 and the various items have all been acknowledged individually. Among the latest contributions were from Mr. Gordon Watney, £23 19*s.*; Capt. R. Smith Barry, R.F.C., £5; Mr. S. F. Edge, £2 2*s.*; "B. O. Hope," £1; J. R. Duigan, £1. Following a suggestion by Miss Chrissie Moore, the little daughter of Sir Newton Moore, the Agent-General of Western Australia, Mrs. Campbell and her children were granted a first-class passage back to Perth.

FLIGHT

THE EFFECT OF FACTOR OF SAFETY.

PROBABLY the first thing that struck one in glancing round the machines that took part in the Military Aeroplane Trials at Larkhill, was the general solidity of construction and design of the British machines, and the apparent lightness of those of some of our French rival firms.

We all fondly hoped that the fine looking and well built Britishers would come out on top, but the success has all been with the light machines with the light engines. So much does this impress one, that the writer has, as doubtless many others have, been forced to alter his opinions with regard to the working stress in the materials used. This does not mean that we can go back to our tin clip and bent wire and copper tube method of construction, but rather the reverse. We want thoroughly sound and searching design in every point, absence of all complications which make design difficult and doubtful, the finest material obtainable, and a factor of safety of 6 or thereabouts, if we are going to meet the foreign constructor on level ground.

Out of about 15 really competing machines at Larkhill 7 have, one would imagine, factors of safety from 5 to 8, and 8 have factors of safety (certainly in places) amounting to 15 or 16.

In practically every case, the light machine has scored over the heavier one, and in many cases the heavy ones have proved incapable of even attempting the tests imposed.

Looking at the problem in simple figures and taking one of the factor of 6 machines which weigh, say 1,100 lbs. all on, to increase this factor of safety to 12 it is, of course, essential to exactly double the size and consequently the weight of all stressed parts, which would bring up the weight of the machine possibly to 1,500 lbs. Now this particular machine may fly excellently well at 1,500 lbs. weight, but by the time it has got its passenger and oil and petrol for four hours, it is positively hopeless and will either only just fly, or won't fly at all, and if it does fly its loading is so high as to make the machine dangerous to handle and consequently unsafe. High loading per square foot of lifting surface is extremely dangerous and the fact is forced upon us more and more daily.

Here then is the crucial point: Is it safer to have a low factor of safety and light loading, or a high factor of safety and heavy loading? Out of the accidents that have happened there have been very few that could be traced to structural defects, but how many have been due to side-slips? High loading necessitates high air speed, and a diminution of speed on a heavily loaded machine through engine failure or any other cause (especially if the machine is on a turn) has, probably, a greater death roll than any other one cause of accident.

Is our extra 400 lbs. in materials really a factor of safety after all? The writer heard two pilots at Larkhill say that without their load of petrol, oil, and passenger, their machines were excellent to handle and very stable, but the addition of a few pounds made them unsafe and extremely difficult to hold in the air at all.

One frequently sees the early type Gnome-engined box-kites performing evolutions in the hands of novices and pupils that would, we all know, bring instant disaster to some of our heavy, small surfaced, high speed machines.

Looking generally at the various types of machines in existence the following points strike one at once:—

1st.—The very light machines with very light motors have been more uniformly successful than have any other type.

2nd.—The very light machines with an excess of power have always been the machines chosen by rough-weather flyers, and

3rd.—Structural breakdowns have been very rare, even with light machines in times of abnormal stress, as in high-wind flying.

It seems obvious then that our essentially British ideas of strength, rigidity, and safety, though quite right for bridges, stationary engines, and machine tools are, if applied to aeroplane construction, likely to hold back the British industry at all times when in competition with the lighter built machines of our French rivals.

If we are out to build the most efficient and prize winning machine then we must keep our factor of safety below 16 or 18 and probably nearer half that figure.

One might say that probably one designer can build a machine quite as light as another, and still by efficiency of design alone have a factor of safety of twice as much as the second designer. Even then, unless the weaker machine collapses (which it seldom does), the cleverer designer has not profited by his cleverness, and he is not, in this case, getting the most out of his machine.

I have heard several pilots say (and quite rightly), that they would rather fly a machine of doubtful constructional strength than a machine that was given to uncontrollability, and certainly there is much less risk to life in testing a machine for structural strength by loading the wings, than in testing a machine in flight for dynamic accuracy.

It is doubtful if anyone can say at present what is the highest safe loading one can carry per square foot and in any case this is certain to vary with every type of machine. There is a general impression that machines are safe up to a certain and fixed point (varying with each machine), and that even a matter of 10 lbs. or so will make the difference between safety and a dangerous machine. This has in a few cases shown itself to be so, but the writer is very much of the opinion that by virtue of the fact that a heavily loaded machine will only fly at a high speed, that machine must of necessity be harder to hold in the air than a machine of large surface in proportion to weight. Very simply it is this, a machine of heavy loading has more to pull it down and less to hold it up.

A heavily loaded machine therefore depends more upon its engine than does a machine of light loading.

The Maurice Farman, for instance, is a machine of some 2½ to 3 lbs. per square foot only, and who would think of trying, on a machine of 8 or 9 lbs. per square foot loading, to perform the feats that can be done on this machine. What Verrier does on the Maurice Farman would be called madness on a heavy small span monoplane.

High loading, therefore, and high factor of safety are directly opposed to adaptability for getting out of tight corners, and although the constants X and ϵ in the recent tables in FLIGHT showed that some machines were more efficient as far as weight per unit of area and h.p. is concerned, the machines with a low efficiency are probably safer to handle than some of the more heavily loaded and so-called more efficient machines.

Not a few of us will be very loth to depart from our healthy looking spars and bracing wires, but competition forces it upon us, and after all it is not an acknowledgment of our having little faith in our designs and calculations when we double and sometimes treble what really ought to be safe enough.

A few fatal accidents have lost us some of our best flyers and friends, and in our struggles and endeavours to prevent recurrences we have clung to "factor of safety," and we have probably gone farther away from efficiency in design without in the least ensuring the lives of those who are taking the places of our friends that have given their lives to teach us more about this science.

Making a chart of machines with their probable average factor of safety, their horse-power and their "tight corner adaptability," I have come to the conclusion that a factor of safety of 7 with a loading of 3½ lbs. per square foot under ordinary flying conditions, and with one-horse power for every 17½ lbs. (or 5 sq. feet), together with good stability design, would probably evolve the safest machine that we can build with our present knowledge of the subject. Lower loading if possible, certainly, but even now the machine will not be easy to design.

In the writer's opinion the one great danger of the future is speed, and the tendency that we may be induced to make our inefficient machines fly by piling on the horse-power.

Like the case of the motor car, the future will, for economic reasons, probably demand smaller powers again, but what will have been the penalty—will projectiles carry our future generations or buoyant wings?

Speed, they say, means less effect of wind puffs, but really do not some of our moderately slow machines handle quite as well in a wind as our fast small monoplanes. Shall we eventually conquer the elements by clever stability design, or shall we have to resort to terrific speed.

In perfectly steady, though perhaps very high winds, practically every well designed machine, whether fast or slow, can venture out, and probably the greatest trouble is the *remous*. The point that we have to settle is this: is a fast, heavily loaded machine a better "*remous* fighter" than the slower, stable and lightly loaded machine? At our present stage it is practically impossible to tell, and each pilot probably would prefer his own particular mount for the job.

On the point of landing, the fast machine is naturally very much in the background, and although very long flights are becoming common, a landing has to be made some time and the very last minute of the flight (or first of the landing) may shatter all our hopes—and machines as well.

If the increase in the rate at which the land is being cut up remains constant for many years, we shall certainly have to design machines that will land at something less than 80 miles an hour, and come to rest in under a quarter of a mile.

A machine made to the specification just dealt with ought, if well designed, to be able to "get off" at something like 25 to 30 m.p.h., accelerate to, say, 60, and land, with a slight "pancake" at about 20. One would call that tolerable and possibly safe.

As far as the writer can see, therefore, low loading is, from every conceivable point of view desirable, and, possibly, essential for future machines, and this inevitably brings us back to our factor of safety again.

If we increase the constructional factor of safety we decrease the dynamic factor of safety (if one may so put it) and it rests with the designer to decide what is really the lowest, but absolutely certain, factor of safety that he can work to.

The British industry is on the eve of a great change: A year or so ago constructors built their first machine more or less on the lines of the light French machines and were reasonably successful.

Reconstruction and re-designing commenced and the whole industry veered round in favour of strength of structure (in fact constructors deliberately competed against one another in putting in the largest spars they could manufacture) and the net result has been a lot of machines that are no better fliers than were those of their first designs.

People are already beginning to say "we no longer require extremely light engines," and they were never more mistaken. Competition demands them, and will continue to demand them, and the constructor's cry will be "horse-power without weight."

The one great thing that the future will have to guard against is "economics." The cheapest machine in every way will be the one that can use the smallest engine because initial costs, and running costs will be so much less than with high powers.

The best machines will be the machines that will climb well and be little affected by addition of passengers and other weights. The best machines will, therefore, be the lightest, and when competition really starts the whole industry will have to strongly guard itself against the few heartless constructors who will ruthlessly and inconsiderately cut weights to the extent of endangering the lives of their pilots.

GRANVILLE E. BRADSHAW.

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"X" AND THE UNINITIATED.

By G. HOLT THOMAS.

As one who suffers from a low "X," perhaps I may be permitted to enlarge upon some of the merits that attend the occupation of the end of the scale that is held with such wholly unassuming isolation by the Maurice Farman biplane in the tabulated results of the Military Trials. I say suffer, advisably, because, while I am sure that Mr. Berriman's intentions in his recent analytical articles are essentially fair-minded towards the machine in question, his X is a little like "caviare to the general" and the more casual reader, who merely notices that the Maurice Farman has $X = 39$ and $\epsilon = 46$—both values very much *below* the normal—is no more than human if he jumps to the conclusion that it has somehow missed the mark. With the editor's permission, therefore, I desire to show that such is *not* the case.

Pretending to be no mathematician myself, X and its "satellites" have been somewhat among the stars, truly; but, if I have read aright, the lesson they teach is, that real safety and slow speed manœuvrability are inseparably bound up by designing for a *low* value of what Mr. Berriman is pleased to call "anticipated efficiency," which is designated for short by the symbol ϵ. It has further been argued that it is the difference between the anticipated efficiency and the efficiency actually demonstrated in flight that is the useful reserve power wherewith the pilot manœuvres as he pleases in restricted spaces and at restricted speeds; but I am inclined to take exception to the tone of the mathematically-exact expression, "at the *expense* of absolute maximum speed," with which the above deduction is qualified in one of the articles.

The italics are my own, but even without this distinction, the word in question is still the significant one in the sentence as read by the ordinary reader. Mathematically, yes; in value of practical utility, no; there is no "expense" in the transaction at all. In fairness to the writer of the original articles—which seem to have given us a new and fairly simple way of summing up some of the essential factors in design, which hitherto, apparently, have eluded this sort of treatment—I admit that the student would have deduced as much; but my object here is to emphasise the fact in untechnical and unmistakable language. If Mr. Berriman's X and ϵ have been necessary either to the understanding or to the confirmation of the truth about the Maurice Farman biplane—and they have a way of their own of drawing attention to facts which may appeal to some people—let us not lose the opportunity of appreciating the full meaning of what they show.

There is no need for me to point out to readers of FLIGHT that the brothers Farman have an unrivalled experience in the building of aeroplanes: the fact is patent to all from the very performances of their machines, even if it were otherwise than already a matter of earliest history. Under the circumstances, therefore, the numerical value of X, ϵ or any other "constant," established on reasonable premises, for the comparison of aeroplane designs that is assigned to a Farman machine, cannot but have a significance of its own for this very reason, and if, as is undoubtedly true in this case, the figures that obtain for the Maurice Farman in the Military Trials are quite removed from the ordinary, there is, surely, all the more reason to give them their due attention.

In the first place, then, we may reasonably seek for the key-note of Farman design, and the first thing that is apparent is that it is *not* a design that has for its standard the somewhat doubtful virtue of high efficiency. So much Mr. Berriman has established by his mathematical deductions, but so much I personally have known to be a fact ever since my acquaintance with the brothers Farman began in France, quite a long time ago. I know that the X articles do not say that high efficiency is the proper standard for the judgment of aeroplanes; indeed, I foresee that in the fulfilment of their purpose they will convince serious readers that it is not; but, what I am afraid of is that during the process of their digestion the more general reader may be inclined to adopt the entirely wrong idea that "low efficiency" is a disparaging remark when applied to the design of a machine. The error is, too, all the more excusable inasmuch as the simplest form of competition is a race, and the winning of a race *per se* does indeed involve the demonstration of the highest possible efficiency, and, therefore, calls on the designer, as Mr. Berriman points out, to "anticipate" as high an efficiency as he thinks it reasonable to expect.

But is flying no more than a race? With men's lives at stake, I venture to think that we may be over anxious to run before we can walk if we lay too much stress upon the absolute ability to move quickly. Far be it from me to deny the virtue of velocity. I desire only to point out that we cannot have everything, and that there is a quality that is akin to velocity, called acceleration, which may be equally if not actually more important. Acceleration, as I understand the laws of elementary mechanics—and here I am in sympathy with Mr. Berriman in his desire to reduce the aeroplane as far as possible to a simple mechanical problem—results solely from the possession of surplus power over and above that actually required by the exigencies of the moment, and the ability to accelerate, which is shown by a wide speed range, is, as I understand the results of the Military Trials, regarded, even by the military authorities, to whom absolute speed might well have been expected to count most, as a *very* important virtue. If anyone doubts this let him study well the figures relating to the Cody, which I should like to say here, as a rival competitor, very thoroughly deserved the first prize on points. It was open to me also to fit a 120-h.p. motor, but I did *not* do so.

It was a very pronounced quality, also, of the Maurice Farman, but this latter machine was never intended and was never expected to excel under the Military Trial conditions, for which a much more powerful machine like the Cody was far better suited. My machine was entered as a standard machine to show that it would fulfil all the tests demanded. The Maurice Farman is designed and built first, last, and always with the basic idea of being safe in the hands of *anyone*. Let me repeat once more the emphasised word "anyone"; for that, indeed, is the ideal that the brothers Farman have always set themselves to attain since they taught themselves to fly in those very early days that modern enthusiasts are sometimes, it seems to me, a little too ready to forget. In flying it pays to remember everything; the failure to profit by past experience of others may too easily be the cause of failing to live long enough to collect data of your own—and so I say again, the Farmans have made the universally safe biplane their ideal, and to that end they have concentrated not only their skill but their far more valuable experience. Only a few months ago I was in Paris with them, and saw that they were flying with the utmost success a rather fast machine of modified design, but by no possible inducement could I persuade either Maurice or Henry Farman to sell the machine, which they admitted flew very well, but was from their point of view of safety, and their idea of the type of machine proper to be put into the hands of the novice, a model of infinite defects.

In short, the brothers Farman have specialised in the building of a machine that anyone can fly anywhere, any time and, within reason, in any weather. We might assume that the application of so much experience would have evolved by now a type of aeroplane that came measurably within reach of its designers' ideals, but the mere facts of recent aviation history surely render unnecessary any such hypothesis. The flying of Farman biplanes all over the world, and notably in the French army, speaks for itself—it is only the significant merit of a low X and ϵ in this respect that it has been my object here to point out.

FLIGHT

BRITISH NOTES OF THE WEEK.

Protecting Warships from Aircraft.

IT is understood, as already announced, that the four armoured warships which are to be laid down for the British Navy this year will be fitted with armoured decks and guards over the smoke stacks to protect them from attacks by aircraft. The vessels are also to be fitted with guns, capable of very great elevation, for attacking airships and dirigibles, for which purpose they will use a new type of shrapnel shell capable of covering a large area.

Col. Cody's Activities.

ALTHOUGH he has never used the title "Colonel," Mr. S. F. Cody says that as "in the recent message of congratulation from the King, his Majesty referred to me as Colonel Cody, in future Colonel Cody it has to be."

On Saturday morning, after flying from Aldershot to High Wycombe, where he had to descend owing to a mishap with his compass, Col. Cody paid a visit to St. John's College, Highbury, and witnessed a display by the Islington Boy Scouts.

Arrangements at Hendon.

THE programme for the second September meeting, which is to take place at Hendon to-day, Saturday, includes a cross-country handicap of about 18 miles and a speed handicap which will be run off in heats. In addition, there will be a number of exhibition and passenger-carrying flights by well-known pilots.

A naval and military meeting is announced for Saturday next, when, in addition to the usual competitions, there will be bomb-dropping and despatch-carrying contests, demonstrations in quick dismounting and erecting, and tests with man-lifting kites and observation balloons. It is probable that an aeroplane fitted with a silent engine will also be seen in the air.

Bath Suggests a Flying Meeting.

AN attempt is being made at Bath to organise a flying meeting to be held some time next month. It is suggested that there should be an exhibition of machines and accessories, with some flying events, including a cross-country race and illuminated night flights, as well as competitions for models and kites. At a meeting held last week it was decided to appeal for a prize fund of £400 and a guarantee fund of £300 to cover working expenses. The secretary is Mr. G. A. Rawlings, The Paddock, Claverton Down, Bath.

Mr. Merriam takes Charge of Bristol School at Brooklands.

THE splendid work done by Mr. F. Warren Merriam at the Bristol School at Brooklands have been recognised by the Bristol Company who have selected him to succeed the late Mr. E. Hotchkiss as manager of the school. We congratulate Mr. Merriam on his appointment, and have no doubt that under his able guidance the school will continue to go forward.

A Biplane Turns a Somersault at Skegness.

VISITORS to Skegness on Thursday week had the unusual sight of a hydro-biplane turning a somersault. When commencing a flight from the beach, the pilot, M. Francois, was obliged to elevate his machine very quickly in order to avoid a woman and child. During this manœuvre the hydro-aeroplane was, however, caught by the wind, and after turning over, it landed on the beach with its wheels in the air. Fortunately the aviator emerged none the worse for his adventure.

More Tests With a Klaxon Horn.

FOLLOWING on the tests which were made with a Klaxon horn at Eastchurch as mentioned in our last issue, we learn from Mr. H. E. Shaw of the Klaxon Co., Ltd., that further tests were made at Hendon last Sunday, at the invitation of the Grahame-White Aviation Co., Ltd. The Klaxon horn was fitted on the Blériot monoplane piloted by Mr. Marcel Desoutter, and after having found that the horn could be easily heard whilst circling round the aerodrome, the pilot flew off in the direction of Cricklewood, blowing the horn at regular intervals. On his return Mr. Desoutter said he had been at a height of a thousand feet and was over Cricklewood when he was farthest out, this representing a distance of practically three miles. In a subsequent flight as arranged, and announced through the megaphone to the crowd, the pilot signalled in the Morse code, the message "Good luck to the spectators."

An Australian Visitor.

AUSTRALIA is keenly interested in aviation just now, and among other visitors to England from the Antipodes is Mr. R. Cussen, the son of the late Hon. Martin Cussen, M.P., of Melbourne. Since arriving in Europe he has flown round Paris and has also made a flight from Hendon on a Grahame-White biplane piloted by Mr. Lewis Turner.

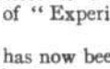
AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Finance Committee.—The following gentlemen have been appointed to serve on the Finance Committee:—Maj.-Gen. R. M. Ruck (Chairman), Mr. A. E. Berriman, Mr. Griffith Brewer, and Mr. F. Handley Page.

Gift to the Library.—The Council desires to thank Mr. C. Dendy Marshall for the gift of a copy of "Experiments in Flying Machines," by Percy S. Pilcher.

Hubbard Testimonial Fund.—This Fund has now been closed, and a sword and cheque presented to Mr. Hubbard.



Wilbur Wright Memorial Fund.—The following subscriptions have been received:—Amount previously acknowledged, £520 1*s.*; Mrs. D. B. Warner, 10*s.* 6*d.*; J. Barclay, Esq., 5*s.* Total, £520 16*s.* 6*d.*

Annual Subscriptions.—Members who have not yet paid their subscriptions for 1912 are requested to do so as early as possible, as the non-receipt of these subscriptions causes great inconvenience.

BERTRAM G. COOPER, Secretary.

The French Army Manœuvres.

IN connection with the French Army Manœuvres, very complete arrangements were made for the employment of aeroplanes, each side being provided with four escadrilles of six machines each, and from all quarters reports are favourable of the splendid work put in. Those with the Blue Army comprised two made up of Henry Farman two-seater machines, one of Blériots, and the remaining one was half Blériots and half Borels. With the Red Army one was of Deperdussin two-seaters, one of Maurice Farman biplanes and one of Hanriot machines, while the fourth was a mixed company of three-seaters, including two Deperdussin monoplanes, two Breguet biplanes and two Nieuport monoplanes. Each machine had to carry certain spare parts, and each army had a complete equipment of motor workshops, &c., and one lurry for every two machines. Two dirigibles were also employed—the "Dupuy de Lome" and "Adjudant Reau."

The manœuvres commenced on Wednesday week, when the "Dupuy de Lome" was in the air for eight hours and the "Adjudant Reau" for six hours. The twenty-four aviators on each side were throughout actively engaged in hundreds of flights, the machines were continually coming and going on both sides throughout the day. It was decided by the umpires that in the event of a machine landing in the enemy's country it should return to its headquarters, and remain neutralised for twenty-four hours. Among the more lengthy flights may be mentioned those of Lieuts. Pierrat, de Vergnette and Massol, and Serjt. Benoist, who each covered about 250 kilometres on the 13th. On the following day Bregi made a flight of 230 kilometres, exploring the region of Chatellerault, Thouars, and Loudun. A report published at the beginning of this week showed that during the first part of the manœuvres, lasting three days, of the four dozen machines taking part, eleven had come to grief temporarily, including four which were captured by the enemy.

A Record Hydro-aeroplane Trip.

ON the Nieuport hydro-aeroplane with which he had been competing at Tamise, Weymann, on Monday, succeeded in flying back from Tamise to Vernon, a distance of 650 kiloms. He was accompanied by his mechanicien, and made stops at Boulogne, Dieppe, and Havre. Leaving Tamise at 6.35 a.m., the first 270 kilom. of the trip to Boulogne, *via* Ostend, Dunkerque, and Calais occupied 1 hour 55 mins. An hour was spent in filling up and looking over the machine, and then the pilot headed for Dieppe at 9.45, and arrived at 11 o'clock. Filling up operations, and some slight adjustments took nearly an hour and a-half, and at 12.25 the machine was in the air on its way to Havre. There a similar stop was made, and getting away at 2.35 p.m. Rouen was passed at 3.45, and the voyage continued in the direction of Paris. On Vernon being reached it was decided to come down and stop for the day.

FOREIGN AVIATION NEWS.

Progress at R.E.P. Works.

SOME Italian officers visiting Buc on Monday last witnessed some tests with a new two-seater R.E.P. monoplane fitted with a 3-cyl. R.E.P. motor. The machine easily lifted a load of 300 kilogs., and attained a speed of 115 k.p.h. Training for a superior *brevet*, Brigadier Vallet was up for three hours on the same day.

A Blériot School at Buc.

IN order to have a school for both civil and military pupils in close proximity to Paris M. Blériot has acquired a stretch of 200 hectares at Haut-Buc.

Perreyon a Superior Pilot.

ON the 12th inst. Perreyon, the well-known Blériot pilot, made a first test for a superior certificate over a course from Etampes to Larcay, near Tours, and back, a distance of 300 kiloms. On the 14th inst. he made a triangular trip of 250 kiloms. from Etampes to Vendome, then to Ceriottes camp and back to Etampes, landing as arranged beforehand at the intermediate points mentioned. His average altitude was well over 1,000 metres.

Cross-country Work by Mme. Pallier.

SOME splendid cross-country work has recently been accomplished by Mme. Pallier on the Astra biplane. On the 11th inst. she ascended at Villacoublay, and after flying over the neighbourhood of Versailles for some time went over to Etampes and landed there. Having rested for an hour she restarted and flew over to Chartres, where she arrived at 10 a.m. three hours after leaving Villacoublay. On the 13th Mme. Pallier flew from Chartres to Versailles and back in about two hours, and on the following day she returned to Villacoublay doing the trip in 50 min.

Motor Gun for Fighting Airships.

DURING last week tests were carried out at Toulon with a new 75 mm. gun, mounted on a motor chassis, designed for attacking dirigibles. An aerial target at a height of 1,000 metres was used.

Tests for the Pommery Cup.

DURING last week the only serious attempt for the Pommery Cup was made by Frantz, who on his Savary biplane started from Douai at 5.31 a.m., although it was raining heavily with a strong wind blowing. He reached Chartres at 8.15, and after 10 mins. rest restarted for Biarritz. He got to Poitiers about noon, and then, as his motor was giving trouble, decided to give up, after covering about 500 kiloms.

Making his way back to Calais to make another attempt for the Cup, Guillaux on his Clement-Bayard monoplane went from Orleans to Issy on the 13th in 1 hr. 10 mins. He went on to Calais on Monday, making a stop at Le Crotoy for replenishments.

New Caudron Superior Pilots.

ON the 10th inst. Sapper Duval on a Caudron, fitted with Gnome engine and Chauvière propeller, made a 200 kilom. flight for a superior *brevet* over the course St. Cyr–Chartres–Orleans–St. Cyr. The same day Lieut. Gerrard, who the previous evening had flown from Crotoy to Beauvais, went on to Amiens and then back to Crotoy, this being the last test for his special military certificate. On the 12th inst. he made a flight of 2½ hours over the country round Crotoy.

Mdlle. Dutrieu in a Motor Smash.

ON the 13th inst. a motor car in which Mdlle. Dutrieu was riding collided with a tree on the Roanne road near Lapalisse, and the aviatress was seriously injured.

Another Good Voyage by Bathiat.

LEAVING Mourmelon on the 7th inst., Bathiat, on his Sommer monoplane flew over to Calais, covering the 400 kiloms. in 3 hrs. 40 mins.

Another Meeting for Berlin.

THE eighth Berlin flying meeting is fixed to take place from September 29th to October 6th. Part of the events will be contested at Johannisthal and the others at Doeberitz. The prize list amounts to £2,400, of which £800 will be devoted to bomb-dropping competitions and the like.

A Berlin-Paris Prize.

A PRIZE of 18,000 marks has been offered by the Rumpler firm for the first German aviator, who, on a Rumpler machine shall succeed in flying from Berlin to Paris in one day.

Aircraft at the German Manœuvres.

IN the recent German Army manœuvres, each force had two aeroplane divisions of six machines each attached to them, and the Blue Army had a Gross and a Parseval dirigible, while the "Zeppelin III" was with the "Reds." Practically no details are available as to the work done, except that it met with the approval of the General Staff, who, however, in commenting on the operations, pointed out that the use of aeroplanes did not render cavalry reconnaissance superfluous, as on two days out of five no flying was possible.

Military Flying in Belgium.

ON the 13th inst. Lieuts. Sarteel and Stellingswerff left Antwerp on a Farman military machine, and after a flight of an hour and a-half they landed on the front at Ostend.

An Uncontrolled Crowd in Spain.

WHILE Lacombe was giving an exhibition flight at Ponferrada on Thursday of last week, a portion of the crowd of 12,000 spectators invaded the aerodrome with the result that, when trying to land, the machine was driven against the grand stand. The machine was smashed up and ten of the spectators were injured, but the aviator escaped unhurt.

A Military School at Buenos Ayres.

A MILITARY flying school was opened at Buenos Ayres on the 10th, when Paillette, the instructor, took up the Minister of War on his Farman. Other flights were made by Mr. George Newberry, President of the local Aero Club, also on a Farman, Tels on a Blériot, and Lieut. Gobat on another Farman. The flying was witnessed by the Navy Minister and chief officers of the Army.

THE LATEST HENRY FARMAN BIPLANE.—This view, taken from the rear, shows very clearly the general arrangement of the new machine. Note the short lower plane, the large ailerons and the arrangement of the central portion of the machine. The outer sections of the main plane can easily be taken off so that the machine can then be towed along the road. The pilot and passenger are seated in the body which projects from the front of the machine and is easily detachable. The photograph also shows the new system of undercarriage to which reference has already been made in FLIGHT.

The Gordon-Bennett Cup.

IN our last issue we were able to give the result of the Gordon-Bennett Competition at Chicago, but no details were then to hand regarding Prevost's performance. He and Vedrines were the only competitors, Frey on the Hanriot not finishing, while the two Americans did not start. The final result was:

1. Vedrines (Deperdussin) ... ... 1h. 10m. 56s.
2. Prevost (Deperdussin) ... ... 1h. 15m. 25s.

The distance of the race was 200 kiloms (125 miles), and the speeds worked out to 169 7 k.p.h. (105 miles per hour) and 167 k.p.h. (103·8 miles per hour) respectively.

And a World's Record.

INCIDENTALLY during his race for the Gordon-Bennett Cup, Vedrines beat the world's speed record for 20 kiloms, covering the distance in 6 m. 56 secs. at a speed of 173 k.p.h.

Legagneux.

Legagneux gets the Height Record.

IN a flight which started from Issy and finished at Villacoublay, on Tuesday, Legagneux, on a Morane monoplane, substantially added to the height record recently made by Garros, getting up to 5,720 metres (18,750 ft.). The altitude of over 3½ miles was reached in 45 minutes, while the descent only occupied round about 10 minutes. During the last 1,000 metres of the climb the pilot had recourse to oxygen. Garros's record was 5,000 metres.

Fourny's New Records.

IN our last issue we were just able to briefly note Fourny's magnificent flight of 1,017 kiloms. in 13 hrs. 22 mins. for the Ae.C.F. Criterium. He used a Maurice Farman military type biplane of 15·5 metre span fitted with a Renault motor and Chauvière "Integral" propeller. Fourny, who is 28 years of age, is the chief instructor of the Maurice Farman school at Buc and has held the world's duration record since September 1st last year, when he covered 722·9 kiloms. in 11 hrs. 1 min. 29 secs. Starting at Etampes at seven minutes to six on the morning of Wednesday week his machine at once got into its stride of 76 k.p.h. and the laps were reeled off with clock-like regularity, in spite of the wind which, according to the anemometer, ranged up to 25 miles an hour. Some rain also fell, but still the pilot went on with his monotonous task, and at half-past four in the afternoon he had covered 800 kilometres and beaten the world's distance record of Gobe, which had stood at 740·299 kilometres. At a quarter past six 900 kilometres had been covered, and although it was rapidly becoming dark Fourny kept on for another hour, eventually coming down at a quarter past seven. From eight hours onward he had beaten the time records and had set up new figures for twelve and thirteen hours, the new records being as follows, with the old ones shown in brackets:—

Hour.	Distance.		Old record.
7	524 kiloms.	...	(Tabuteau, 522 kiloms.)
8	592·800 kiloms.	...	(Fourny, 510 kiloms.)
9	668·800 kiloms.	...	(Fourny, 580 kiloms.)
10	752·400 kiloms.	...	(Fourny, 650 kiloms.)
11	828·400 kiloms.	...	(Fourny, 710 kiloms.)
12	912 kiloms.		
13	988 kiloms.		

Turks Capture an Italian Airman.

THE distinction to be the first airman to be captured in actual war has fallen to the Italian Capt. Moizo, who, having landed near Zanzur in order to adjust the engine of his Nieuport monoplane, was captured by a party of Arabs and taken to the Turkish head-quarters at Azizia.

Two American Fatalities.

THE International Aviation Meeting at Chicago which followed the Gordon-Bennett race was marred by two fatal accidents. The first occurred on the evening of the 11th inst. when, while making a steep *vol plané*, the Columbia biplane of Paul Peck fell to the ground from a considerable height, the pilot being killed instantly. The second accident was on Sunday evening, when a collision occurred between a Wright biplane, piloted by Howard Gill, and a Borel monoplane driven by Mestach. The two machines were racing in the twilight and apparently Gill tried to pass too close under the monoplane. In the resulting smash he was so seriously injured that he died while being taken to the hospital.

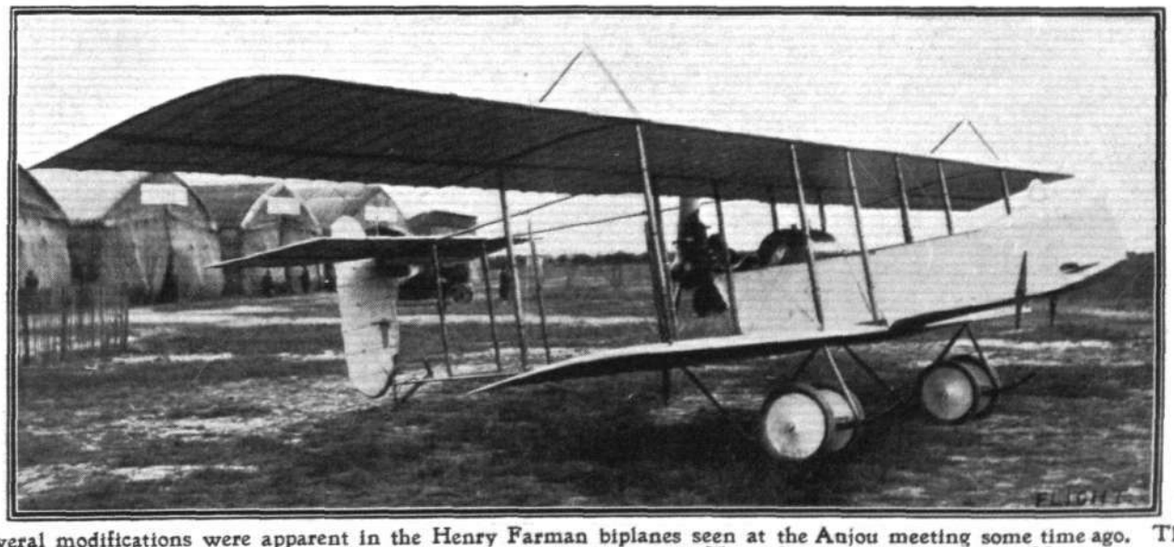
AIRSHIP NEWS.

Parseval to Build Rigid Airship.

IT is announced that the Parseval firm which has hitherto built airships of the semi-rigid type is now adopting the rigid system. The first of the new airships is to be ready in from six to seven months' time. While they follow somewhat on the Zeppelin lines the new Parseval dirigibles will not have an aluminium framework, but one made of wood as in the case of the Schutte-Lanz.

Wireless Tests with "Adjudant Vincenot."

THE Astra dirigible "Adjudant Vincenot" left Issy on Monday morning, and made a cruise of 2½ hours over St. Denis, Chantilly, Aubervilliers, &c. Throughout the time communication was kept up with Paris by means of wireless telegraphy.



Several modifications were apparent in the Henry Farman biplanes seen at the Anjou meeting some time ago. The rear plane was quite flat and on a level with the top main plane. The lifting area amounted to 40 sq. metres.

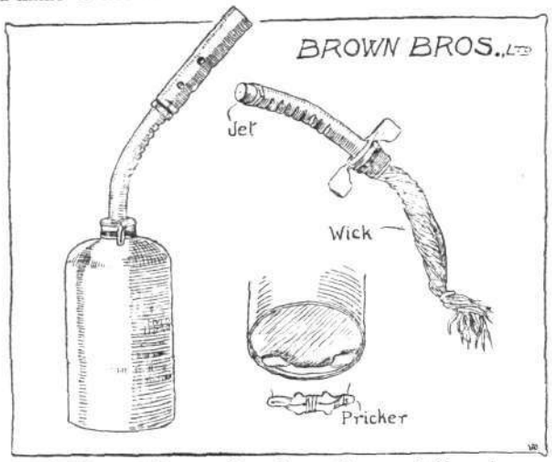
THE BELGIAN HYDRO-AEROPLANE COMPETITION.

DURING the last days of the hydro-aeroplane meeting at Tamise the weather was slightly better enabling some very good flights to be made, one of the best being that by Renaux on the 14th inst., when he took a passenger and covered 300 kiloms. in five hours. We were able to give details regarding the performances on the opening day in our last issue, and on the second day, the 10th inst., Renaux (M. Farman), Beaumont (Donnet-Leveque), Busson (Brouckere), Benoist (Sanchez Besa), Chemet (Borel), Molla (R.E.P.), Weymann (Nieuport), Gobe (Nieuport), Barra (Curtiss) each made flights of various durations, and carried out the navigability test. Unfortunately, Busson met with a serious accident, his machine falling and both pilot and passenger were injured, the latter, Borie, so severely that he died three days later. During the morning of Wednesday heavy rain prevented any flying, but during the afternoon Beaumont was up for twenty minutes and Train for a quarter of an hour. That was the only flying possible, and in the evening the competitors were busy rescuing their machines from their camp which had been inundated by a storm. The following day was fine, and a good deal of flying was seen, Chemet at the end of the day leading in the competition with Renaux second and Beaumont third. On Friday, thirty different flights were accomplished with the various machines. Benoist and Molla, each going up six times while Chemet, Beaumont and Renaux each made four separate flights, the last mentioned including one of over an hour's duration. Saturday saw the best flying of the meeting, Renaux leading the way with his passenger flight of 300 kiloms. in 5 hours, Benoist being a good second with 240 kiloms. in 3 hours, the flight being cut short owing to a failure in the petrol supply. Benoist covered 240 kiloms., Molla 120 kiloms. and Beaumont 100 kiloms. This gave the lead in the competition to Renaux. Several flights were also made on Sunday, although no very extraordinary work was done. The R.E.P. monoplane was caught by the wind and capsized but fortunately both the pilot and his passenger were rescued, none the worse for their ducking.

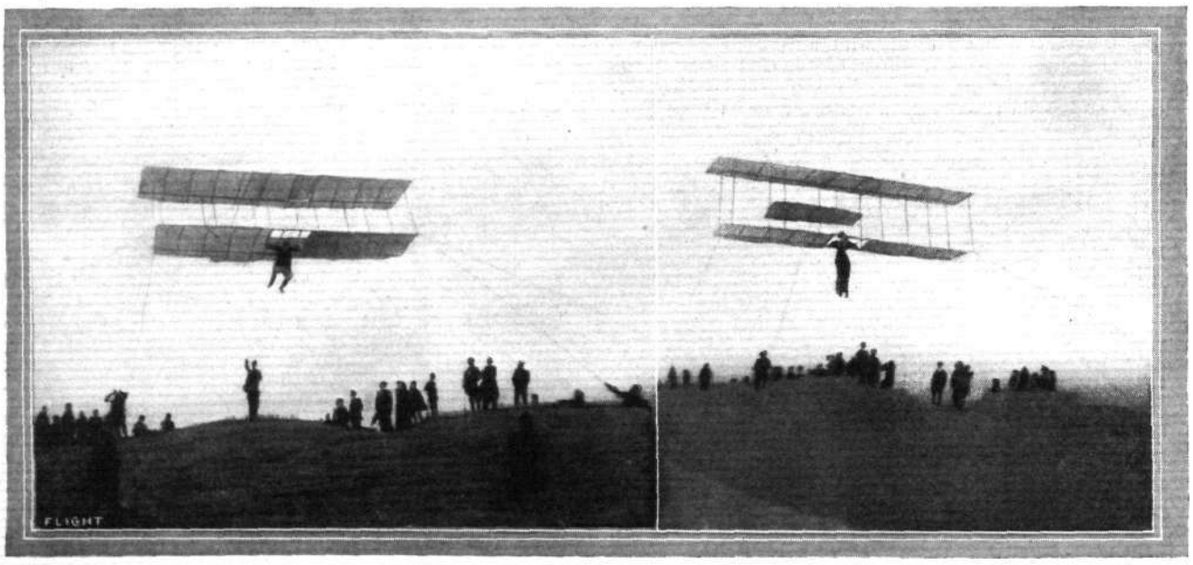
This was the finish of the meeting, and at midday on Monday the results were announced. Of the five sections which made up the competition, Beaumont won that for totalisation of flights with Renaux, Benoist, and Chemet sharing second place. In the navigability event, Barra was first with Chemet and Renaux second and third respectively, and in the alighting and rising tests, Chemet led with Renaux and Beaumont sharing the second place. In the speed trials, Molla was first, having covered the 20 kiloms. in 12 mins. 1⅛ secs., and Chemet was second with Beaumont third, while in the competition for non-stop flights, Renaux held the leading position with 300 kiloms., Benoist being second with 240 kiloms., and Chemet third with 220 kiloms.

A HANDY BLOW-LAMP.

THERE are always a number of small soldering jobs and the like to be found in connection with aeroplane work that are not big enough for the application of the ordinary Swedish blow-lamp, or where too hot a flame is not advisable. We show in the accompanying illustration a really very handy little petrol blow-lamp that is just the thing to fill the gap. It is marketed by Messrs. Brown Bros., Ltd., of Great Eastern Street, London, E.C., and is named the "Imp," and sells at 5*s*. It is strongly made, nickel-plated, and measures about 6 inches high when ready for use. In operation it is perfectly simple, there being no pressure pump or adjusting devices. Screwing into the petrol container is a nozzle or neck carrying a length of wick, which dips into the petrol. A nipple having a very small hole is at the top of the neck, forming a jet for the petrol, and fitting over this hole is a brass tube which serves as an induction tube, air being drawn in through holes in the sides. To start the lamp it is only necessary to hold a lighted match under the corrugations formed in the neck and the petrol soon vaporises and issues from the jet, mixing with air in the induction tube, finally forming a hot flame at the mouth of the latter. Once it is going the heat of the tube and neck keeps up sufficient pressure for the lamp to burn for about two hours at one fill. A small pricker, for cleaning the jet, is provided with each lamp, there being a spring clip on the bottom of the lamp for holding it. We have had the opportunity of trying one of these little blow-lamps, and find it most successful.



Sketch of Messrs. Brown Bros.' small petrol blow-lamp, the "Imp."



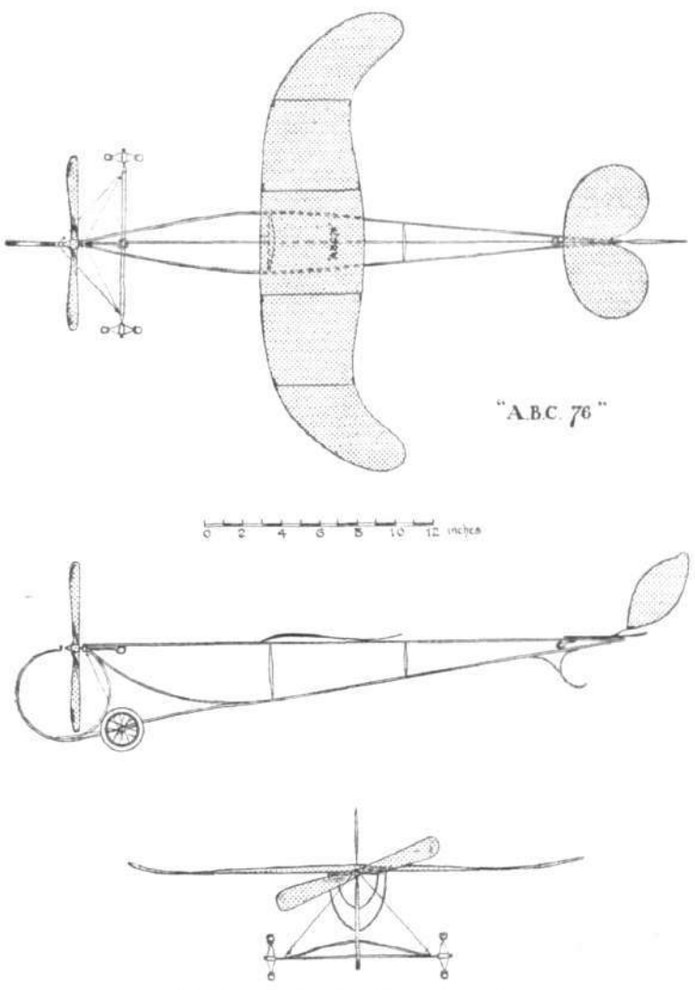
Numerous successful gliding experiments have been carried out this summer by two students of the Technical College, Aksel Faber and W. E. Reck, at the Danish summer resort, Hornbak, near Marienlyst (Hamlet's grave). The glider employed was of the Chanute type, and glides up to 300 ft. in length were obtained. A young English lady, Miss Nancy Berry, seen in the air in the right-hand photo, acquired such skill in controlling the glider that she made several glides of 200 ft. in length at a height of 25 ft. to 30 ft. In the left-hand photo Mr. Aksel Faber is in the machine.

Models

Conducted by V. E. JOHNSON, M.A.

Tractorplanes.

ON September 28th next, an open competition will be held under the auspices of the K. and M.A.A. for single tractor screw models rising from the ground under their own power—60 marks for duration, 40 for stability, and on October 5th, a club competition of a very similar kind will be held by the Paddington and Districts Model Aero Club. From various sources we learn of renewed and increasing interest in this type of model—a type at present admittedly not "fool proof," and one in which the obtaining of the necessary inherent stability, gliding angle, &c., is considerably more difficult than in the ordinary loaded elevator type. Under such circumstances, the following communication from Mr. A. B. Clark, of the Blackheath Aero Club, is of especial interest.



Mr. A. B. Clark's No. 76 model.

Mr. A. B. Clark's Tractor No. 76.

In this model, with the exception of the screw, which is 9 ins. diameter and 13·5 ins. pitch—the dimensions closely approximate to those of full sized machines. The *fuselage* is 28 ins. long and is built of silver spruce and bamboo, the latter being used for the distance pieces (or struts). The maximum depth and width is, approximately, 3 ins. at about one-third from the front. The *main plane* is made of 18 S.W.G. piano-wire, and covered with "Hart's" fabric. It has half-an-inch camber at the centre, with a gradual "wash-out" towards the end-ribs; a slight negative angle is given to the tips. The span is 24·5 ins.; chord at the centre, 5 ins.; the tips (as clearly shown in accompanying drawing) are turned back 2 ins. The *tail* is made of 20 S.W.G., and has a maximum span and chord of 8 ins. and 4 ins., respectively. The tail is turned up *slightly* at the rear, but no negative angle is given to it. The *rear-fin* is constructed of the same gauge-wire, and has an area of 7 sq. ins. The high position of the fin should be noted.

The *landing-chassis* (which *is* used for landing purposes as well as starting) is made of bamboo, and, it will be noticed, is fitted with a central skid, which is turned up in front until it *nearly* touches the boss of the propeller. At the end of this skid there is a loop of piano wire, which is pressed on to the small cone fitted to the boss; whenever the model hits a wall, tree, &c., the shock is thereby transmitted all over the machine, and so saves the skid from snapping, as the stoutest skid is apt to do on such occasions.

The *screw* (propeller) is, already stated, 9 ins. diameter, and pitch 13·5 ins., and is of special design (exactly similar tractor-screws can be obtained from Messrs. J. Bonn and Co.).

The *motive power* is four strands of *thick* ¼-in. strip, 24 ins. long, weight approximately ½ oz. The number of turns given is 600. The length of flight is from 140 to 150 yards in calm air—after having arisen from the ground—the duration about 35 secs. On several occasions the flight has ended in a glide.

The weight of the complete model is 3⅜ ozs. In a speed test the model flew a straight course, which on measurement was found to be 128 yards in 35 secs.—there was no wind at the time, as was proved by the smoke from several spectators' cigarettes. This speed is approximately seven and a-half miles an hour, which enables anyone easily to keep pace with the model in flight and closely watch its behaviour which lends it an additional interest of a no mean order. The accompanying illustration, showing the model in flight, is from a negative taken by Mr. H. H. Groves, who is quite an expert in snapshotting models when in free flight.

Photo by Mr. H. H. Groves.

"A B C 76" in flight at Blackheath.

Messrs. T. W. K. Clarke and Co.'s Featherweight Wheels.

Mr. A. B. Clark, in his communication, says nothing with respect to the wheels with which his model is fitted; no more suitable or lighter wheels could be found than Mr. T. W. K. Clarke's new featherweight covered-in one and a-quarter inch wheels. On carefully weighing a set of three we found their combined weight was just two grammes. Being of the covered-in double-disc type they offer the minimum air resistance and the flange is of quite sufficient breadth to enable a model to get off short grass, and we have already seen a hydro-aeroplane rise from the surface of the water and land on

land, when fitted with them in addition to its floats. It is, perhaps, scarcely necessary to add that the model found no difficulty in accomplishing the converse or opposite task.

Mr. Dean's Rule for Rubber Motors.

Mr. F. Robinson (Hon. Sec. Folkestone Model Aero Club) writes *re* the above. Like Mr. Noorduyn, I can in no way agree with Mr. Dean and think that a hard-and-fast rule is impossible. May I quote one or two examples. C. Cornes flying on Saturday last in a dead calm, distances well over 250 yards, was using a 30-in. A-frame model with 9 ins. bent birch propellers and 9 strands a side of $\frac{1}{8}$ in. strip rubber. I have myself flown models over 300 yards using 6 strands a side of $\frac{5}{16}$ in. strip and 8 ins. propellers —the models weighing over 4 ozs.

Replies in Brief.

W. J. WILLIAMS.—Photos, &c., to hand and shall appear in due course.

A. V. R.—Try a Bonn's 12 ins. centrale type propeller. From 16 to 20 strands.

K. A. ROBBINS.—Try a simple *light* iron (not brass) right angled bracket and fix it to the rod by well binding with thread, the bracket will not slip along the rod if the horizontal part be on the opposite side of the rod. Use a piece of 18-gauge piano wire, sharpen one end, bend about $\frac{3}{8}$ in. right round, so as to be parallel to the longer portion. Put the longer end through the hole in the boss. It must not fit loosely; if it does, pack carefully with, say, copper-foil, then drive home, and convert exposed end of wire into usual hook.

F. G. PETER.—We regret the drawings sent are not sufficiently clear for reproduction. Also, you give practically no details of your model; full details must be given. As you will see, an excellent example is given in our present issue.

C. N. HAY.—Your span is somewhat large for your propeller diameter. The length of your fuselage depends on what ideas you may be endeavouring to carry out in your general design. It is really impossible to give a hard-and-fast answer to a question of this character. Your wheels must be ahead of your c. of g., or your model will tip forward; or you can have one wheel well in front and two sufficiently far back to prevent the model from tipping backwards. As your model is single-propeller type, the latter is the better plan. Let the wheel-base be fairly large.

C. W. TAYLOR.—Glycerine, if pure, is not a grease; nor is it oily. Soda and water is all right if freshly applied; try some Bragg-Smith lubricant. It should be, but everything depends on the efficiency of your machine. A special motor is not necessary; a *light* steam engine would answer. Special motors are not easy to to make.

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THE KITE AND MODEL AEROPLANE ASSOCIATION.

OFFICIAL NOTICES.

British Model Records.

Hand-launched	Distance ...	...	A. E. Woollard	... 477 yards.
	Duration ...	...	A. F. Houlberg	... 89 secs.
Off ground ...	Distance ...	...	F. W. Jannaway	... 84 yards.
	Duration ...	...	G. Rowlands ...	... 30 secs.
Hydro, off water—Duration		...	G. P. Bragg-Smith	... 25 secs.

Competitions.—The two kite competitions which were to have been held on Saturday afternoon, on Wimbledon Common, had to be postponed on account of the weather. Had the wind permitted, a most interesting contest would have taken place, for the competitors would have demonstrated the use to which they considered was the best a kite could be put to, and included wireless telegraphy, photography, ship-to-shore or life-line carrying, and signalling. However, the judges, at 4 o'clock, decided that no contest could take place, and Major B. Baden-Powell decided that this and the other contest for kites should take place on Saturday, October 19th.

Ornithopter Competition.—Entries for this competition should be sent in at once to the hon. secretary. Latest date for receiving, October 5th. Prize, £5, presented by Major B. Baden-Powell. The prize will be awarded to the designer of the model which, in the opinion of the judges, performs the best flight, travelling a distance of not less than 100 ft. through the air. The donor thinks that the principle of flapping wings is a mode of aerial propulsion which may prove to be of greater efficiency than that obtainable by screw propellers, therefore has offered prize to see the principle tested in model form. Competitors should note that the prize is offered to the designer, therefore bought models are barred.

Model Competition, at the 100-Acre Field, Greenford, September 28th, at 3 o'clock. Duration and stability competition for single-tractor screw models, rising from the ground under their own power. Free to members; non-members entrance fee, 2*s*. Prizes: 1st, cup (presented by Col. Fullerton); 2nd, silver medal of K. and M.A.A. and a Mann monoplane (presented by Mann and Grimmer); 3rd, bronze medal of K. and M.A.A. Maximum marks, 100, viz., 60 for duration, 40 for stability. Rules: 1. Competitors may submit models of any kind. 2. Models must not weigh less than 6 ounces. 3. Competitors must be at the judges' flag at 2.30 o'clock. Those not present at that time will be disqualified. 4. Models to be timed from time of leaving ground till time of landing, or till they disappear from the judges' view. 5. Competitors will not be allowed to replace any part (or parts) without the permission of the judges. 6. Each competitor is entitled to three trials if time permits. Entries close Saturday, 21st.

Official Trials.—The first official trials for single-tractor screw models will take place on Saturday, 28th, after the above competition. These trials will be for duration and for distance, and applications must be sent in on the forms (which can be had on application) before September 21st.

Entries for all Competitions.—Competitors should note that in future no entry for any competition will be accepted if received after the date stated in the rules of the competitions.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

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PROGRESS OF FLIGHT ABOUT THE COUNTRY.

Model Clubs: Name of District only given. In brackets: Secretary's address.

Notes regarding Clubs must reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

Blackheath Aero Club (48, HAFTON ROAD, CATFORD, S.E.).

SUNDAY, 10 models at Blackheath, including 1 hydroplane, 2 r.o.g. single tractors, and usual types of "A" frame, &c. Later at Grove Park, Messrs. Dollittle, Dennis and Woollard flew their machines. Flying next week-end at Grove Park and Blackheath. All club communications to Mr. Dollittle 31, Guinness's Buildings, Brandon Street, Walworth, S.E., between dates 21st and 28th September.

Brighton and District ("KINGSLEIGH," KINGSWAY, HOVE).

R.O.G. and duration competition to-day (Saturday), at 2.30 p.m. R.o.g. in 12 ft. or under, 50 marks; for every foot above 12 ft., 2 marks less; for every second in the air, 2 marks. Tractors allowed bonus of 50 marks.

Chislehurst & Dist. Ae.C. (JASMINE COTTAGE, CHISLEHURST).

FLYING week-end by Messrs. Datlen, Kemsley (twin screw monos.), Pacham (r.o.g. tractor mono.), S. Dodd (r.o.g. mono.), and secretary (r.o.g. biplane). Flying Sunday afternoon, cricket ground.

Croydon and District Aero Club (Sec., 136A, HIGH STREET).

SATURDAY, at Mitcham Common: Messrs. T. and E. Saunders good flights (big model); D. Pavely (staggered biplane) 34 and 35 secs. duration, 223 yards distance; W. Bells, 395 yards distance, 60, 66 and 75 secs. and out of sight; P. Hart (hydro tail-first mono.); Mr. Fowler, Aldershot club, also fine flights. Club has now more accommodation for new members.

Hackney and District (THE HOLLIES, 47, JENNER ROAD, N.).

SATURDAYS official durations: Louch, 95 secs. (0-1-1 P2); Marmin, 62 (0-1-1 P2); Vans, 60 (0-1-1 P2); W. A. Dore 56 (1-1-0 P2); S. Dore, 30 (1-1-0 P2); Bond, 45 (0-1-1 P2); S. Lewin, 37 (1-1-0 P1); Herron, 40 (0-1-1 P2). Illuminated flying took place in the evening. This is to be a feature of the club. Saturday meetings during the winter.

Hendon Model Aero Club (8, MONTAGU ROAD, W. HENDON).

SATURDAY E. A. Lawrence raised club duration to 37 secs. Hayward and Barton good altitude and durations. Brown, Hills and Doidge also out. To-day (Saturday), duration contest for trophy.

Paddington and Districts (77, SWINDERLY ROAD, WEMBLEY).

RESULT club tractor competition: Mr. C. Levy won 1st prize, a stop watch. To-day (Saturday), another stop watch is offered as 1st prize for tractors, the previous winner will not compete. Mr. Johnson's competition is arranged for October 5th. Models may be hand-launched and marks will be awarded for duration and stability. Single or twin screws may be used. The Eagle Aeroplane Co. have generously offered a model, value 10*s*. 6*d*., for competition; this will be a duration handicap, on October 12th.

Reigate, Redhill and District (8, BRIGHTON ROAD).

FLYING at "Wiggie" on Sunday. Norton, M. Wilson, R. Wilson, Sutton, Jordon, Greenhead, Welch and Burghope "1-1-P2-ing." J. Sutton with self-riser (211 yards) and J. W. Burghope hydro flying, off every time with 0-P2-1. Rawson Cup, 21st.

Scottish Ae.S. Model Aero Club (6, MCLELLAN STREET, GOVAN).

SATURDAY, flying by Mr. J. Donaldson at Winton Drive, Messrs. Langlands at Broomhill (racer mono). At pond, Alexandra Park, Mr. Gordon trying new floats and propellers on hydro-aeroplane, which made several brilliant flights from the surface, the model rising well on every occasion. To-day (Saturday), competition at Paisley Racecourse 3.30 p.m.; events, distance and duration. September 28th members visit Lanark Aerodrome. September 30th grand display by club at same place, when Mr. Wilson's Caudron biplane will be seen.

Sheffield Model Aero Club (35, PENRHYN ROAD, SHEFFIELD).

BOISTEROUS weather Saturday accounted for the Colver Cup not being won. Weather permitting, the cup will be competed for again at Marsh Farm, High Lane, Eccleshall, on September 28th, at 3 p.m. Competition September 21st, at above ground 3 p.m.

Windsor Model Flying (10, ALMA ROAD, WINDSOR).

SATURDAY, S. Barton, with r.o.g. tractor, 20 secs. and 100 yards. Others flying: S. Camm, Stanbrook, Dowsett, F. Camm, and Eldridge. Glider will be tried to-day.

Yorkshire Ae.C. (Model Sec.) (53, WEST STREET, LEEDS).

COMPETITION result at Roundhay: 1st, Mab, 375 ft.; 2nd, Holmes, 340 ft. Flying to-day at Beeston.

SCHOOL AERO CLUB.

Southgate County School Ae.C. (72, NATAL RD., NEW SOUTHGATE).

GOOD flying during the week by Messrs. Reed (400 yards); Redotteé (250 yards); Ellis, r.o.g. biplane, and Rogers, 3-ft. tail-behinder (over 300 yards).

CORRESPONDENCE.

**** *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letters intended for insertion, or containing queries.*

Correspondents communicating with regard to letters which have appeared in FLIGHT, would much facilitate ready reference by quoting the number of each letter.

The Dunne Monoplane.

[1627] In reply to "Dunnite's" questions I must own to one mishap other than when landing. I was piling leaden weights on to what corresponds to the tail, in order to verify the critical loading at which the uncontrolled machine would pancake, and eventually failed to assume control quickly enough to save my skidwork.

The longest straight I have done without touching any control is a little over a mile, on a "bumpy" day in a ten mile average wind. At the end of that stretch the machine was still travelling smoothly and evenly straight ahead, and there was nothing to indicate that it would not continue to do so until the petrol was exhausted. Having satisfied myself on that point, I turned the machine, because it was getting over mud-flats and shoal-water. Variation in engine torque is the most common cause of departure from the true compass course, so the use of the engine throttle would greatly simplify matters. Therefore I am inclined to think that "Dunnite's" first test could be effected without much difficulty.

The second test is, I believe, far more simple. Here again the most that I have done or attempted is two consecutive circles without moving any control. The circles were very narrow and steeply banked and appeared to be traced uniformly. The termination of the second was similar in all respects to the commencement of the first, so I see no reason why the machine should not have completed another four if necessary.

I would not myself be inclined to regard tests such as these as in any way sati-factory, for it is obvious that a machine might be able to do all these things and still be distinctly dangerous. Circling over *remous* with very steep banking; rough-weather flying with sharp turns; sudden stoppages of the engine; all to be done "hands off" and "feet off" constitute the only practical tests of stability. And the measure of that estimable quality is inversely as the distance the machine drops below its proper air-path before it has completely recovered itself from the effects of some given atmospheric disturbance.

United Service Club. J. W. DUNNE.

The Danger of the Vertical Rudder.

[1628] It is the present fashion to steer aircraft by means of two separate rudders working at right angles to each other, one normally vertical for direction, the other normally horizontal for elevation—in other words a turner and a lifter. This system of steering is easy, simple and effective, and each rudder performs its own duty without interfering with the function of the other, provided the aircraft is travelling on an even keel. But the moment the machine heels over to the right or left, the turner begins to interfere with the lifting, and the lifter has something to say to the turning. If the list amounts to 45°, then each rudder is equally a turner and a lifter (Fig. 3). The system is no longer simple and easy, but complicated, obscure, and full of danger.

It is now recognised—but it has taken a sorry list of tragedies to bring the fact home—that it is dangerous to turn sharply in the air. People talk loosely of "side slips" (apparently inwards), just as they talk of "holes in the air," neither having any existence in fact.

A "side slip" inwards is impossible. The term belongs to cycling, and the slip is caused by the wheels getting an insufficient grip of the ground to resist the centrifugal force of a sharp turn. The wheels slip outwards, and man and machine come to the ground.

With aircraft the conditions are different. The machine is not propped up but suspended in the air. In turning, the wings resist the centrifugal force in addition to that of gravity. The machine therefore naturally banks, quite apart from the fact that the inner wing, by slowing down, has lost some of its resisting power against gravity alone. In a very sharp turn at high speed, the centrifugal force may be so strong, that gravity for the time being can be ignored, as in the case of looping the loop. This banking, however steep, is not only quite natural but perfectly safe in itself, provided the wings are strong enough to resist the extra strain.

Of course, there is a certain amount of slip, but it is not a side slip, nor is it dangerous. If a man whirls a cannon ball round and round by a chain, the weight may pull him outwards, thus increasing the circle, but even if he suddenly lets the chain go, the ball will not at once fall to the ground, but fly off at a tangent to the circle it was describing.

The danger of a sharp turn arises, not from the natural banking, but from the action of the turning rudder, which is now swinging the tail upwards as well as outwards (Fig. 3). If this upward swing of the tail is not at once checked by raising the elevator (Fig. 3), the machine will make a dangerous dive earthwards.

M. Blériot has pointed out that, at the commencement of the dive, the pressure has been transferred from the under to the upper surface of the wings. This might very well cause the machine to turn over, to enable the wings to meet the pressure in the way they were designed to meet it. But at any rate it would appear to seriously hamper any attempt to get the tail down. My own opinion is—but I do not wish to press it—that the pilot would have the best chance (because the complications would be fewer) if he trusted to the normal elevator alone, and took his feet at once off the helm control. But (unfortunately, it seems to me) he has come to regard this control as a foot-rest, whose only power of action is to turn the machine to the right or left when required.

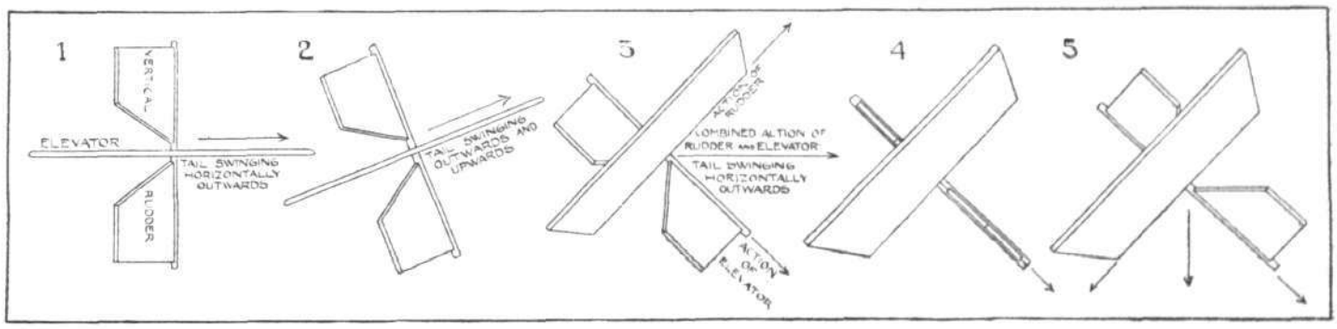
Of course, the turn can be made without banking at all by counteracting the natural inclination to bank. But this necessitates a certain amount of room which is not always available.

Sept. 11th. R. BROCKLEHURST.

Gyroscopic Force of the Revolving Motor.

[1629]. In the copy of American *Aero* of June 15th, appeared an article under the above heading that told of "actual results" obtained by "direct experiment" of Louis and Laurent Seguin, builders of the Gnome Motor, which, they claim, show that the gyroscopic force generated in a revolving motor on a turn is not sufficient to be dangerous.

Let us examine closely the report of the experiment in question. A 50-h.p. Gnome was mounted on a platform in such a manner that while running it could be turned either in a vertical or a horizontal direction. When the platform made a horizontal turn in 45 secs. the tendency to turn in a vertical plane (gyroscopic force) was balanced by a weight of 11·7 lbs. at a distance of 39 ins. from the axis. When the platform made a turn in 24 and 12 secs. the balance weight increased to 23·3 and 57·6 lbs. respectively.



Now first and most important notice that they admit the presence of gyroscopic force in all these experiments. The claim is that it is not sufficient to be dangerous. Let us see.

In a 12 secs. turn, the quickest one which they report, there is 57 lbs. of the force to be overcome. Now M. Bouchard Praceig, the French engineer, in *Le Nature* of March 4th, 1911, has shown that the gyroscopic force increases in the same ratio that the speed of the turn increases. A 12 secs. turn is a slow turn, and the slow turns never have been and never will be dangerous. The turns that have been fatal, such as those of Chavez, Blanchard, Hoxsey, Moisant, Johnstone and many others, have all happened in the fraction of a second, so quick that the eye of an observer could hardly see what happened. If a 12 secs. turn generates a 57-lb. blow, then a one

second turn will generate 12 times as much or a 684-lb. blow, and a half-a-second turn a 1,368-lb. blow, which would be just about enough to capsize or collapse any aeroplane that was ever built.

In preparing an apparatus for one of his experiments, Mr. Brooke, who first discovered the dangers of gyroscopic force, suspended a gyroscope in the air by a rope so that it was free to turn in any direction, the same conditions as described in the Gnome experiment. When he came to test the gyro force he found it so weak compared to what was felt when the gyro was held in the hands without other support that the apparatus was abandoned for demonstration purposes. He found that the supporting rope had received more than 70 per cent. of the gyro strain. This showed positively that the action of the gyroscope in the air, unsupported, is entirely different and considerably more powerful than when it is anchored to the ground by any character of support. To demonstrate this in another way Brooke placed a gyroscope in a round bottom bowl that was floating in water. Then, by a quick push, he changed its plane of rotation horizontally. Instantly it dived and sank. The bowl in water represents the same condition as the aeroplane in the air. Anyone who is sceptical can easily try this experiment and see for himself what happens.

I also think of another actual experiment that I have seen carried out by Mr. Brooke.

Twin gyros weighing 8 ozs. apiece were mounted independently in a four-wheeled frame and were set to rotating. With a hair stretched taut between his two hands Brooke gave the rear end of the gyro frame a sudden pull sideways. Instantly it reared up on its two front wheels and began slowly to turn around a circle. Quickly he struck the end that was floating in the air a 20-lb. blow with his fist. The blow had no effect on it whatever. It continued its circular movement, the rear end still in the air. Then he took the hair again and arrested the circular movement. Instantly it dropped back on its four wheels with a thud. A rotar weighing less than a pound had generated a force *twenty times greater than its own weight* in overcoming an attempted change in the plane of its rotation.

A prominent Chicago aviation engineer, in arguing this matter with the writer, admitted that according to the Seguin figures there would be 684 lbs. of gyroscopic force generated in a one second turn, but said that this was not sufficient to be dangerous, because the 684 lbs. was distributed through the wings in such a manner that at the centre of the wing warp on each wing there would only be in the neighbourhood of 50 lbs. of it to be overcome by the controls. A 50-lb. push up on one wing and a simultaneous 50-lb. pull down on the other, or, what would be the same thing, a 100-lb. pull down on only one wing, would not be dangerous. According to this theory a 100-lb. weight could be suddenly thrown on one wing of an aeroplane in flight and the operation would be perfectly safe. Is it possible that anyone can credit this? If so, would the believer consent to try the experiment with his life as the stake? Hardly. Not if he has observed the delicate balance of a machine in flight, sensitive to the least touch on the controls and the merest breath of wind. When everyone is agreed that this force is present in a flyer and has to be reckoned with, why argue that it is not dangerous because it can be overcome by the controls. Certainly it can be overcome by the controls and counteracted nine times out of ten when the aviator is quick enough, but some day the tenth time comes, the turn is too sudden, the force is just a trifle too strong for the ailerons, and we read of another "unknown cause" fatality where the machine capsized and dived headfirst.

c/o Holliday Engineering Co., RALPH M. PEARSON.
749, Bunker Street, Chicago, Ill.

[This is the second letter that we have received from Chicago in the last few weeks containing an attack on the Gnome engine, and we are rather at a loss to understand the *raison d'être* of their origin. The laws of gyroscopic force are fairly simple, and it is open to anyone to work out for themselves just how much it will be under any given conditions, and if they need any assistance in this matter there is a helpful article in FLIGHT, November 19th, 1910, which gives the formula and a curve. It is surely not a question whether gyroscopic force does or does not exist, but whether the ordinary exigencies of flying cause it frequently to assume a dangerous magnitude such as would be likely to destroy the pilot's control over his machine. Experienced pilots to whom we have spoken on the matter of the gyroscopic force of Gnome engines have always told us that they can recognise its presence by the difference in the effect when turning to the right or turning to the left, but we have heard no one complain of real danger in this connection, so far as the models ordinarily in use are concerned. The 100-h.p. Gnome has, we admit, been criticised in our presence, and we know that some pilots do not altogether like flying with a rotary engine of this weight and power. One of the characteristics that, presumably, may be attributed to gyroscopic force is a tendency to set up a very bad tremor through the machine when turning, and there is nothing that most pilots dislike worse when they are in the air than any sort of vibration.

The difficulty about calculating the numerical value of the couple produced by gyroscopic action lies in the uncertainty as to the rate at which the machine changes its course in space. For our own part we are inclined to think that the most serious aspect of the situation lies in the effect that the couple might have on any weakness or slackness in the engine mounting that might give it a minute degree of free play.

There are many reasons why one naturally hopes that the typical revolving engine, with its many natural limitations, will not always remain the *ne plus ultra* of aero motors, but let us at least be fair-minded towards the engine that has done so much to make flying what it is to-day.—TECH. ED.]

Miss Quimby's Blériot.

[1630] The statement has been published that the new 70-h.p. passenger Blériot machine in which Miss Quimby was flying with Mr. Willard at the time of her tragic death at the Boston meet, has been sent back to the Blériot factory in Paris, France. Will you kindly say the monoplane is still in New York? I am constantly receiving letters regarding the matter, and Miss Quimby's parents authorise me to make this statement as executor of her estate.

JOHN A. SLEICHER (executor of the last will and testament of the late Harriet Quimby).

New York, September 5th.

PUBLICATIONS RECEIVED.

Modèles d'Aeroplanes ; leur Construction. By A. Fieux. Paris: Librairie Aeronautique, 40, rue de Seine. Price 2 fr.

The Boy's Playbook of Science. By the late Prof. J. H. Pepper. Revised, rewritten and brought down to date by John Mastin, M.A. London: George Routledge and Sons, Ltd. Price 5*s*.

Aeronautical Patents Published.

Applied for in 1911.

Published September 19th, 1912.

12,756. G. S. DODMAN. Airships.
19,664. J. STODDART. Flying machines, airships, &c.

Applied for in 1912.

Published September 19th, 1912.

1,713. H. L., A. E. AND H. O. SHORT. Floats for flying machines, and dirigible balloons.
5,449. H. H. RIDLEY AND H. J. WHITE. Landing chassis for aerial machines.
5,829. S. DE LAN. Dirigible airships.
7,886. F. M. EGGERT. Flying machines.
9,547. L. F. BANCROFT. Aeroplanes.
13,608. O. REUTER. Aerial propellers.
13,883. G. MEES. Aerial propellers.

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